

THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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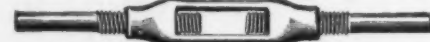
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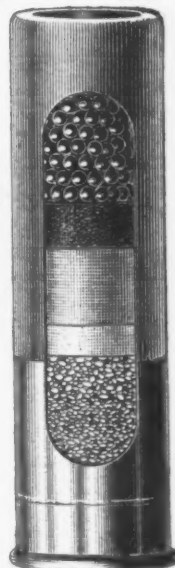
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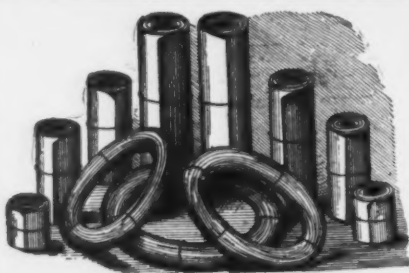
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THE IRON AGE.

THURSDAY, NOVEMBER 30, 1899.

Copper in Steel.

BY ALBERT LADD COLBY, SOUTH BETHLEHEM, PA.

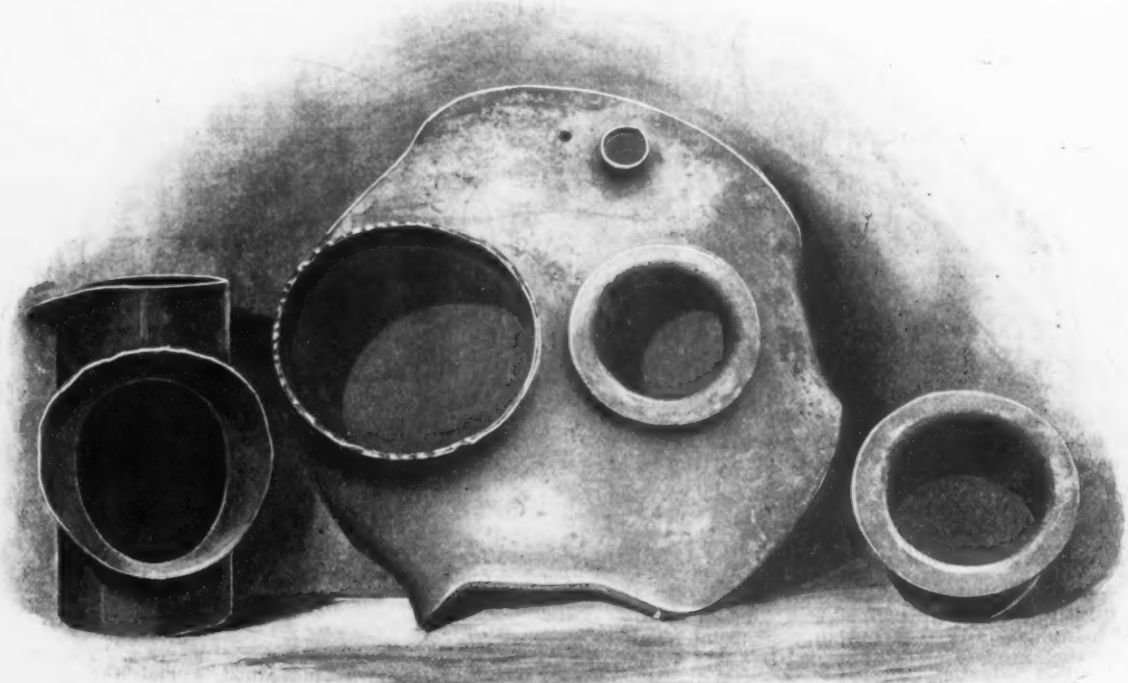
This report was briefly outlined by the author at the joint meeting of Committee No. 1 of the American section of the International Association for Testing Materials and the Association of American Steel Manufacturers, held in Philadelphia on November 17, to discuss any disputed points in the standard specifications for steel which are being framed by the various subcommittees of Committee No. 1. A motion was carried at the joint meeting to take advantage of the courteous offer of *The*

copper. The plates would have passed the Government requirements, except that some of the transverse bars for cold bending test and quenching test failed. The plates stood severe welding and flanging tests perfectly. (See half-tone.)

4. Examples of high and low copper (0.057 to 0.306 per cent.) Bessemer steel which gave similarly satisfactory results on very rapid reduction. (Table No. 8.)

5. Examples of high and low copper (0.055 to 0.36 per cent.) Bessemer steel which underwent an operation similar to flanging with equally satisfactory results. (Table No. 9.)

6. Examples of high copper Bessemer steel varying in carbon from 0.11 to 0.65 per cent. and in copper from



Flanging Tests of $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ Inch Plates Made of Steel Carrying 0.575 Per Cent. Copper.

COPPER IN STEEL.

Iron Age to print the report in full so that the members of Committee No. 1 and others interested might have an early opportunity to study in detail the facts presented, which show conclusively that it is unnecessary to specify a limit of 0.05 to 0.10 per cent. of copper in any kind of steel.

The report may be summarized as follows:

1. Tests on an experimental United States Navy shaft made of steel carrying 0.565 per cent. copper. The results show that the shaft forged well and would easily have passed United States Navy specifications.

2. Tests on an experimental United States Navy 6-inch gun tube made of steel carrying 0.553 per cent. copper. The tube showed no defects after forging and oil hardening, and gave physical results much beyond navy requirements.

3. Tests on experimental $\frac{1}{4}$, $\frac{3}{8}$, $\frac{1}{2}$ and $\frac{3}{4}$ inch plates for United States battle ships carrying 0.575 per cent.

0.292 to 0.486 per cent., which were rolled into billets without the rejection of a single bloom or billet on account of red shortness. (Table No. 10.)

7. Examples of high copper Bessemer rail steel which showed no red shortness in rolling. (Table No. 11.)

8. Examples of open hearth plate steel, with average of 0.075 per cent. copper, which made satisfactory locomotive fire box plates and United States Navy plates. (Table No. 12.)

9. Analyses of open hearth nickel steel, with over 0.08 per cent. copper, which was drawn into bicycle tubing without evidence of red shortness.

10. Proof that the tendency in the determination of copper is toward low results, so that many steels which have given satisfactory results may have been higher in copper than supposed and hence would have furnished evidence against the opinion of those considering 0.05 or 0.10 per cent. deleterious.

11. Outline of method for determination of copper in steel.

12. Analyses proving that copper segregates but little in comparison with other impurities in iron and steel, and therefore cannot cause local irregularities in physical properties. (Tables Nos. 14, 15, 16.)

13. A list of references of copper in iron and steel obtained by reviewing 31 metallurgies and 323 volumes of technical journals and transactions of scientific societies.

Copper in Open Hearth Steel.

The following experiment was carried on in 1897 to ascertain the influence of about 0.60 per cent. copper in open hearth steel forgings (shafts and gun tubes) and also open hearth plate steel. The average analysis of six pigs, representing a lot of 44 tons of No. 2 X Lebanon pig iron purchased for this experiment, was as follows:

	Per cent.		Per cent.
Copper	0.636	Manganese	0.140
Silicon	1.690	Graphitic carbon.....	3.336
Phosphorus	0.034	Combined carbon.....	0.468
Sulphur	0.810	Iron (by difference).....	93.665

To obtain scrap for the experimental open hearth heats of approximately the same copper content as the pig iron to be used, some 40,000 pounds of Lebanon pig was melted and boiled down in an open hearth furnace

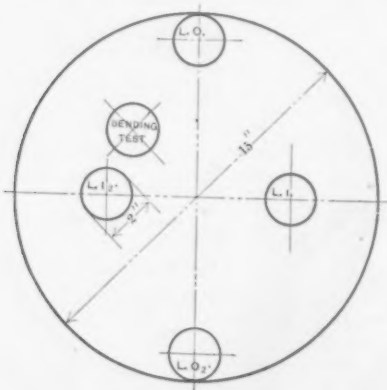


Fig. 2.—End of Shaft, Showing Location Longitudinal Test Bars.

to about 0.50 per cent. carbon and cast into 14½-inch square ingots. The analysis of this scrap heat was as follows:

	Per cent.		Per cent.
Copper	0.590	Silicon	0.119
Carbon	0.510	Phosphorus	0.450
Manganese	0.640	Sulphur	0.032

Three open hearth heats were then made from the Lebanon pig iron and high copper scrap ingots, boiling down with iron ore and recarburizing as usual. Table No. 1 gives the analyses of these heats.

TABLE No. 1.

	Heat A. Per cent.	Heat B. Per cent.	Heat C. Per cent.
Copper	0.565	0.553	0.575
Carbon	0.250	0.390	0.138
Manganese	0.640	0.700	0.390
Silicon	0.149	0.182	0.042
Phosphorus	0.047	0.057	0.044
Sulphur	0.034	0.055	0.038

Open Hearth Steel Forged Shafting.

Heat A was made to imitate as closely as possible, both in chemical composition (with, of course, the exception of copper) and in method of melting, the heats made for crank shafts for the United States battle ships, which were then required to show a tensile strength of 58,000 pounds per square inch in a specimen cut from the annealed forging, and an average elongation of 30 per cent., with no test below 28 per cent. The heat was cast into a mold 35 inches in diameter and the ingot subjected, as usual, to fluid compression. It was then reheated and forged into a steel shaft 15 inches in diameter and 14 feet long, with the same precaution as to temperature of finishing, percentage of discard, &c., as is customary for shafts subject to United States Navy specifications. The ingots worked very well under the forging press, there being no apparent difference from the usual run of steel of this composition. The shaft was then annealed in the usual manner and the physical qualities determined by cutting out and turning up for test eight longitudinal bars, United States Navy standard (½ inch diameter and 2 inches between measuring points), four from the top and four from the bottom end of the shaft.

One bending bar machined to ½ x 1 x 5½ inches was also taken from each end of the shaft.

The United States Navy bending test required that this piece be bent flat on itself when cold without showing cracks or flaws. Both of these tests were bent double and hammered together without showing cracks or flaws. The following results show excellent physical qualities, a good elongation and contraction of area, with a tensile strength and elastic limit considerably above the United States Navy requirements, and therefore prove that 0.565 per cent. copper in forged steel shafts exercises no deleterious influences whatever.

TABLE No. 2.

Location of specimens.	Tens. strength. Lbs. per sq. in.	Elas. limit. Lbs. per sq. in.	Elongation in 2 ins. Per cent.	Contr'n of area. Per cent.
Top end longitudinal inner bar LI.....	67,230	37,690	32.00	51.00
Top end longitudinal inner bar LI-2...	66,720	37,690	30.00	50.14
Top end longitudinal outer bar LO.....	66,960	37,540	28.50	46.32
Top end longitudinal outer bar LO-2...	68,750	38,700	32.00	51.82
Bottom end longt. inner bar LI.....	67,230	41,760	34.00	56.44
Bottom end longt. inner bar LI-2...	64,680	36,670	31.50	51.82
Bottom end longt. outer bar LO.....	68,010	40,910	30.00	55.45
Bottom end longt. outer bar LO-2...	67,230	36,670	31.00	52.38

NOTE.—These elastic limits were determined with an electric contact micrometer.

Fig. 2 is a sketch of the top end of the shaft, showing the location of the tensile bars and the bar from which

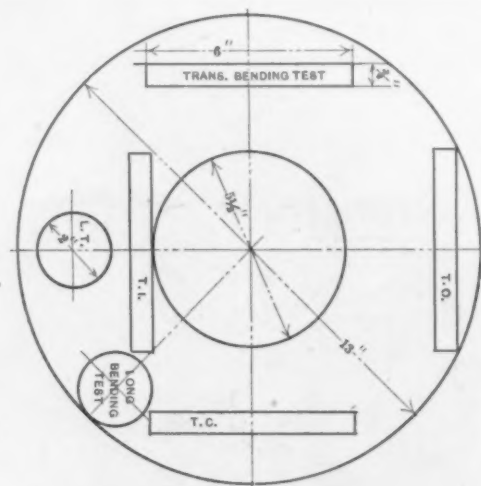


Fig. 3.—Top End of U. S. Navy 6-Inch Gun Tube, Showing Location of Longitudinal and Transverse Tensile and Bending Bars.

the bending test was machined. The five specimens from the bottom end of the shaft were similarly located.

Open Hearth Steel Forged Gun Tube.

Heat B (Table No. 1) was made to imitate a heat of medium gun steel, such as used for United States Navy 6-inch gun tubes, required to meet the following specifications:

Tensile strength per square inch, 75,000; elastic limit per square inch, 36,000; extension in 2 inches, 20 per cent.; contraction of area, 35 per cent.

The heat was cast into a mold 35 inches in diameter and the ingot subjected, as usual, to fluid compression. It was then reheated and forged to 13 inches diameter by 50 inches long, with the same precautions, &c., as is customary for the United States Navy 6-inch gun tubes. The ingot was free from cracks and worked well under the forging press. The forging was then rough bored and rough turned to the outside and inside diameter of a 6-inch navy gun tube. It was next oil hardened and annealed by the same method used for gun tubes, and was in first-class condition after this treatment. Longitudinal and transverse bending tests and longitudinal and transverse tensile tests were then taken from each end of the forging. The longitudinal bending tests were bent flat without breaking or showing any cracks, and the transverse bars were bent around a 1-inch pin without cracking or breaking. Table No. 3 shows that the physical properties of the gun tube were excellent, being much higher than the specification called for in tensile strength, elastic limit, elongation and contraction of area, thus proving that 0.553 per cent. copper exercises no deleterious influences in gun steel of this class.

TABLE No. 3.

Location of specimens.	Tens. strength. Lbs. per sq. in.	Elas. limit. Lbs. per sq. in.	Elongation in 2 ins. Per cent.	Contraction of area. Per cent.
Top end longitudinal				
inner bar LI.....	80,470	48,890	27.50	53.48
Top end transverse				
inner bar TI.....	80,970	47,870	26.25	46.11
Top end transverse				
center bar TC....	79,960	47,870	23.00	38.21
Top end transverse				
outer bar TO.....	80,470	47,870	23.00	38.84
Bottom end longt.				
inner bar LI.....	78,940	45,840	29.10	56.17
Bottom end trans.				
inner bar TI.....	76,190	43,970	23.35	40.45
Bottom end trans.				
center bar TC....	76,390	43,800	22.65	40.05
Bottom end trans.				
outer bar TO.....	75,880	43,800	24.50	44.04

NOTE.—These elastic limits were determined with an electric contact micrometer.

Fig. 3 is a sketch of the top end of the gun tube and shows the location of the longitudinal and transverse tensile bars, and the longitudinal and transverse bars

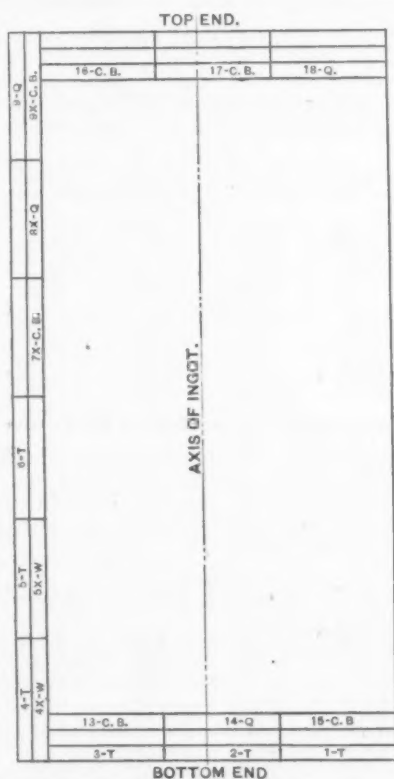


Fig. 4.—Plate Showing Location of Longitudinal and Transverse Tests.

from which the bending tests were machined. The six specimens from the bottom end of the gun tube were similarly located.

Open Hearth Plate Steel.

Heat C (Table No. 1) was made to imitate chemical composition (excepting as to copper) and in treatment in the furnace the heats made for ship plates for United States battle ships Nos. 7, 8 and 9, of a thickness of $\frac{3}{4}$, $\frac{1}{2}$, $\frac{3}{8}$ and $\frac{1}{4}$ inch, and required to show a tensile strength of 60,000 pounds per square inch and an elongation of 25 per cent. in 8 inches.

The heat was cast into two rectangular ingots 24 x 36 inches, which were cogged down under a forging press and two slabs cut from each ingot. Both ingots forged well and the four slabs showed neither cracks nor scabs. The following statement shows the size and weight of the slabs:

Ingot No. 1, Slab A, 30 x 3 x 24 inches long, 728 pounds, to make a $\frac{1}{4}$ -inch plate.
Ingot No. 1, Slab B, 30 x 4 x 45 inches long, 1564 pounds, to make a $\frac{3}{8}$ -inch plate.
Ingot No. 2, Slab C, 30 x 4 x 35 inches long, 1224 pounds, to make a $\frac{1}{2}$ -inch plate.
Ingot No. 2, Slab D, 30 x 4 x 40 inches long, 1394 pounds, to make a $\frac{3}{4}$ -inch plate.

Slabs A and C came from the bottom end of the ingots, slabs B and D from the top end of the ingots.

The tensile tests and elongations quoted in Table No.

4 show that all but the $\frac{1}{4}$ -inch plate passed the specification, and this failed slightly in extension on account of a delay in rolling, which caused the plate to be finished at so low a temperature that the tensile strength was raised to 65,910 pounds and the elastic limit to 52,023 pounds.

The bending and quenching tests of the longitudinal bars were satisfactory; some of the transverse bars developed cracks or broke in testing (Tables 5 and 6). The location of the coupons from which all the tests were taken is shown in Fig. 4.

Welding Test.

The welding properties of the $\frac{3}{4}$, $\frac{1}{2}$ and $\frac{1}{4}$ inch plates were tested by shearing into two pieces a longitudinal coupon from each of the three plates, welding the sheared surfaces, machining specimens to sizes and breaking in testing machine. Table No. 7 shows a tensile strength of over 60,000 pounds in all three welding tests. The specimen from the thinnest plate, $\frac{3}{8}$ -inch, broke at the weld. The other two did not break at the weld. In addition to this welding test made on coupons the two smaller pieces of plate, shown in the accompanying photograph, were welded into shape from a piece of the $\frac{1}{4}$ -inch and a piece of the $\frac{3}{4}$ -inch high copper plates, and did not open up at the weld when flanged. The line of welding passed through the center of the flanged parts:

TABLE No. 7.—WELDED BARS.

Ingot No.	Slab.	Thick-ness of plate.	Loca-tion of specimen.	Tensile strength.	Elastic limit.	Elonga-tion in 8 inches.	Contraction of area.
1.....	B	$\frac{3}{8}$ in.	4x-L	60,870	35,100	25.00	57.47
2.....	D	$\frac{1}{2}$ in.	4x-L	64,110	37,870	19.50	40.24
2.....	C	$\frac{3}{4}$ in.	5x-L	61,630	42,570	10.37	9.29

NOTE.—These elastic limits were taken with dividers and not by drop of beam.

Fig. 4 shows the location of the longitudinal and transverse coupons from which the tensile test, cold bending test, quenching test and welding tests of the four plates were made.

Flanging Test.

The photograph on the first page shows the results of the severe flanging test to which the $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ inch high copper plates were subjected. No fracture or crack or other defect developed even where the metal was most severely strained in flanging. When it is considered that these three pieces contained 0.575 per cent. copper the needlessness of limiting copper in boiler, fire box and structural steel to 0.050 or 0.100 per cent. is apparent.

In conclusion it is only necessary to add that the preceding statement represents a complete report of this experiment.

TABLE No. 4.—TENSILE TESTS.

Ingot No.	Slab.	Thickness of plate.	Location of specimen.	Tensile strength.	Elastic limit.	Elongation in 8 inches.	Contraction of area.
1	A	$\frac{1}{4}$	T 1	65,610	50,750	Per cent.	Per cent.
			T 2	65,390	52,080	18.25	40.20
			T 3	65,600	51,470	25.38	49.40
			L 4	66,560	53,890	22.00	48.00
			L 5	66,000	52,100	24.37	56.50
			L 6	66,300	51,850	24.37	56.20
			Average...	65,910	52,023	22.91	51.30
2	C	$\frac{3}{8}$	T 1	62,040	44,080	25.50	49.90
			T 2	63,320	41,690	26.50	46.40
			T 3	62,370	39,560	27.00	47.40
			L 4	61,670	39,770	25.75	59.80
			L 5	61,170	41,780	26.50	60.50
			L 6	61,490	41,100	28.63	56.60
			Average...	62,010	41,330	26.64	53.40
2	B	$\frac{1}{2}$	T 1	59,980	37,390	23.00	45.30
			T 2	59,460	38,230	24.13	38.00
			T 3	60,450	38,460	25.37	42.30
			L 4	61,520	37,610	26.75	58.20
			L 5	61,450	38,410	26.50	58.40
			L 6	61,330	38,180	26.25	57.00
			Average...	60,698	38,047	25.33	49.90
1	B	$\frac{3}{4}$	T 1	62,040	44,080	25.50	49.90
			T 2	63,320	41,690	26.50	46.40
			T 3	62,370	39,560	27.00	47.40
			L 4	61,670	39,770	25.75	59.80
			L 5	61,170	41,780	26.50	60.50
			L 6	61,490	41,100	28.63	56.60
			Average...	62,010	41,330	26.64	53.40

NOTE.—These elastic limits were taken with dividers and not by drop of beam.

TABLE No. 5.—COLD BENDING TESTS.

Ingot No. Slab.	Thickness of plate.	Location of specimen.	Bent around pin diameter of thickness plate.	Hammered flat.	Remarks.
1 A	$\frac{1}{4}$ in.	7x-L	No cracks.	Slight on one edge.	Axis of ing. passes through bar No. 17-T.
		9x-L	No cracks.	No cracks.	
		13-T	Broken.	Broken.	
		15-T	Broken.	Broken.	
		16-T	Broken.	Broken.	
2 C	$\frac{3}{8}$ in.	7x-L	No cracks.	No cracks.	Axis through No. 17-T.
		9x-L	No cracks.	No cracks.	
		13-T	No cracks.	No cracks.	
		15-T	Small cracks.	Broken.	
		16-T	Small cracks.	Broken.	
2 D	$\frac{1}{2}$ in.	7x-L	No cracks.	No cracks.	Axis through No. 17-T.
		9x-L	No cracks.	No cracks.	
		13-T	Small cracks.	Cracks opened wider.	
		15-T	Small cracks.	Cracks opened wider.	
		16-T	Very small cracks.	Cracks very slight.	
1 B	$\frac{3}{4}$ in.	7x-L	No cracks.	No cracks.	Axis through No. 17-T.
		9x-L	No cracks.	No cracks.	
		13-T	Small cracks.	Broken.	
		15-T	Small cracks.	Broken.	
		16-T	Crack on edge.	Cracks slightly enlarged.	

TABLE No. 6.—QUENCHING TESTS.

Ingot No. Slab.	Thickness of plate.	Location of specimens.	Bent around pin diameter of thickness plate.	Hammered flat.	Remarks.
1 A	$\frac{1}{4}$ in.	8x-L	No cracks.	No cracks.	Axis of ingot passes through No. 14-T.
		9-L	No cracks.	No cracks.	
		11-T	No cracks.	Broken.	
		18-T	Broken.	.....
2 C	$\frac{3}{8}$ in.	8x-L	No cracks.	No cracks.	Axis through No. 14-T.
		9-L	No cracks.	No cracks.	
		14-T	Small cracks.	Broken.	
		18-T	Small cracks.	Broken.	
2 D	$\frac{1}{2}$ in.	8x-L	No cracks.	No cracks.	Axis through No. 14-T.
		9-L	No cracks.	No cracks.	
		14-T	Small opening.	Broken.	
		18-T	No cracks.	Small cracks.	
1 B	$\frac{3}{4}$ in.	8x-L	No cracks.	No cracks.	Axis through No. 14-T.
		9-L	No cracks.	No cracks.	
		14-T	No cracks.	Small cracks.	
		18-T	No cracks.	No cracks.	

High Copper Bessemer Merchant Steel.

Table No. 8 gives examples of high and low copper Bessemer steel which gave similarly satisfactory results on very rapid reduction.

TABLE No. 8.

Low and high copper Bessemer steel, drawn at a single heat from 4-inch billets down to wire 0.04-inch diameter, without slightest indication of red shortness.

Copper plus						
Copper.	Sulphur.	Sulphur.	Carbon.	Mangan.	Phosphor.	Silicon.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
0.057	0.047	0.114	0.080	0.40	0.080	0.009
0.096	0.062	0.158	0.076	0.53	0.086	0.010
0.306	0.110	0.416	0.080	0.32	0.067	0.010

Table No. 9 shows that high and low copper Bessemer steel underwent an operation similar to flanging with equally satisfactory results.

TABLE No. 9.

Low and high copper Bessemer steel, rolled into plates $\frac{1}{2}$ to 11-16 inch thick, cut into disks, heated and forced into an octagonal armor plate cup in one operation, without cracking.

Copper plus						
Copper.	Sulphur.	Sulphur.	Carbon.	Mangan.	Phosphor.	Silicon.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
0.055	0.081	0.135	0.060	0.31	0.059	0.010
0.056	0.108	0.164	0.068	0.53	0.065	0.007
0.061	0.097	0.178	0.078	0.57	0.071	0.008
0.162	0.115	0.277	0.068	0.45	0.076	0.008
0.251	0.084	0.335	0.090	0.48	0.060	0.005
0.360	0.087	0.437	0.064	0.41	0.047	0.012

Table No. 10 shows a run of heats containing higher copper than usual in our Bessemer steel. The carbons vary from 0.11 to 0.65 per cent, the copper from 0.292 to 0.486 per cent. These heats were reheated and rolled with no extra precaution and without the rejection of a single bloom or billet on account of red shortness or roughness.

TABLE No. 10.

Soft and hard high copper Bessemer steel for merchant purposes, all of which was rolled without the rejection of a single billet on account of roughness.

Copper plus						
Copper.	Sulphur.	Sulphur.	Carbon.	Mangan.	Phosphor.	Silicon.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
0.359	0.072	0.431	0.126	0.74	0.074	0.026
0.355	0.080	0.435	0.110	0.91	0.076	0.022
0.394	0.098	0.492	0.110	0.73	0.079	0.023
0.292	0.086	0.378	0.260	0.96	0.094	0.080
0.337	0.105	0.442	0.300	1.12	0.074	0.116
0.366	0.092	0.458	0.480	0.72	0.072	0.132
0.486	0.104	0.590	0.500	0.67	0.074	0.172
0.373	0.095	0.468	0.620	0.73	0.068	0.316
0.339	0.087	0.426	0.640	0.73	0.076	0.375
0.380	0.118	0.498	0.650	0.75	0.070	0.298

High Copper Bessemer Rail Steel.

Table No. 11 gives typical analyses of high copper Bessemer rail steel, heats made 1892-1897, when using a larger proportion of Cornwall pig iron than usual. None of these heats show red shortness when rolling. Many other similar analyses could be quoted.

TABLE No. 11.

Copper.		Sulphur.		Copper.		Sulphur.		Copper.		Sulphur.	
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
1892.				1894.				1896.			
0.397	0.110	0.263	0.073	0.222	0.074	0.397	0.110	0.263	0.073	0.222	0.074
0.394	0.089	0.257	0.077	0.205	0.089	0.394	0.089	0.257	0.077	0.205	0.089
0.368	0.098	0.244	0.099	0.167	0.082	0.368	0.098	0.244	0.099	0.167	0.082
0.359	0.095	0.236	0.103	0.160	0.075	0.359	0.095	0.236	0.103	0.160	0.075
0.352	0.103	0.236	0.101	0.137	0.084	0.352	0.103	0.236	0.101	0.137	0.084
1893.				1895.				1897.			
0.226	0.091	0.356	0.081	0.245	0.087	0.226	0.091	0.356	0.081	0.245	0.087
0.163	0.085	0.338	0.076	0.240	0.094	0.163	0.085	0.338	0.076	0.240	0.094
0.151	0.076	0.334	0.095	0.228	0.089	0.151	0.076	0.334	0.095	0.228	0.089
0.139	0.092	0.324	0.097	0.211	0.081	0.139	0.092	0.324	0.097	0.211	0.081
0.116	0.106	0.317	0.081	0.198	0.064	0.116	0.106	0.317	0.081	0.198	0.064

High Copper Open Hearth Plate Steel.

Table No. 12 quotes a few representative analyses from a number of heats of open hearth plate steel, with copper 0.075 per cent. or over, which were used successfully for the manufacture of locomotive fire box plate and United States Navy plates.

TABLE No. 12.

Copper.	Sulphur.	Phosphor.	Carbon.	Mangan.	Silicon.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
0.075	0.026	0.031	0.20	0.30	0.018
0.075	0.027	0.036	0.16	0.48	0.034
0.075	0.029	0.037	0.15	0.37	0.018
0.075	0.033	0.033	0.18	0.43	0.032
0.076	0.028	0.033	0.20	0.38	0.033
0.076	0.037	0.039	0.18	0.37	0.020
0.077	0.030	0.033	0.15	0.31	0.006
0.078	0.030	0.033	0.19	0.37	0.058
0.078	0.030	0.038	0.186	0.42	0.011
0.079	0.029	0.035	0.21	0.59	0.040
0.079	0.064	0.073	0.201	0.35	0.064
0.082	0.030	0.032	0.23	0.40	0.014
0.082	0.032	0.031	0.21	0.30	0.007
0.091	0.043	0.054	0.14	0.32	0.013
0.096	0.052	0.069	0.10	0.30	0.011
0.139	0.046	0.055	0.15	0.46	0.023

High Copper Open Hearth Nickel Steel.

In Table No. 13 the analyses of a few of a number of similar open hearth nickel steel heats containing 0.080 per cent. and over of copper are given. These heats were rolled down to slabs, then into sheets, which latter were cut into disks; each disk was then drawn into bicycle tubing without giving evidence of red shortness or other defects.

TABLE No. 13.

Copper.	Sulphur.	Phosphor.	Carbon.	Mangan.	Silicon.	Nickel.
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
0.080	0.029	0.021	0.24	0.56	0.124	4.940
0.080	0.040	0.023	0.26	0.53	0.145	5.290
0.082	0.020	0.036	0.23	0.46	0.112	4.928
0.082	0.025	0.026	0.24	0.58	0.144	4.968
0.082	0.028	0.028	0.21	0.33	0.077	4.938
0.083	0.019	0.035	0.23	0.39	0.102	5.017
0.088	0.031	0.028	0.24	0.57	0.156	5.002
0.089	0.026	0.026	0.24	0.55	0.155	4.991
0.089	0.033	0.028	0.23	0.48	0.104	4.961

Steel May Contain More Copper Than Reported by Chemists.

The ordinary chemist, unfamiliar with the difficulties of its determination, does not report all the copper contained in steel, as it is difficult to precipitate by an electric current all the copper present in a solution, especially if the amount is relatively small. It can be done if care is taken to keep the strength of the current constant, but many chemists do not realize the necessity of measuring the current, and hence simply attach a few cells of a battery or a few incandescent lamps and think that the requirements have been met as long as the current is not so strong that the copper deposits in flakes

on the weighed platinum vessel. The error of incomplete separation of the copper could be materially reduced by taking 10 grams of sample for analysis. Such a large weight, however, is seldom used by chemists for the determination of copper and is recommended by only one text book on methods for analysis of steel (Arnold's). It is not, therefore, surprising that in check analysis on carefully mixed drillings of an iron containing 0.078 per cent. copper one chemist should have reported 0.044 per cent. and another that it contained no copper at all. It follows that probably many steels giving satisfactory results, and represented to be low in copper, actually contain from 0.050 per cent. to 0.1 per cent., and would furnish evidence against the opinions of those who consider these percentages deleterious.

Method for Determination of Copper in Steel.

Dissolve 10 grams of steel drillings in 150 c. cm. of sulphuric acid (1-10); when dissolved dilute to 400 c. cm. and precipitate the copper with 3 grams of sodium thio-sulphate, filter off the copper, wash well with hot water, transfer the filter paper and precipitate into a porcelain crucible and roast to convert the copper sulphide to cupric oxide. Dissolve this in a mixture of 8 c. cm. of dilute nitric acid and 3 c. cm. of concentrated sulphuric acid, and evaporate to sulphurous acid fumes. Dilute and precipitate the copper electrolytically on a platinum cylinder, maintaining a uniform current of 4-10 ampere until precipitation is complete, which can be determined by testing the liquid with sulphureted hydrogen water.

Copper Segregates But Little in Comparison With Other Impurities in Steel.

Table No. 14 compares the analysis of the ladle test, taken when filling the ingot molds, with the analysis of drillings from different depths in two holes of the ingots of a heat containing 0.590 per cent. copper. The highest copper found in the ingot was 0.608 per cent., in drillings



Fig. 5.—High Copper Steel Ingot, Showing Location of the Two Holes Drilled to Study Segregation of Copper, Table 14.

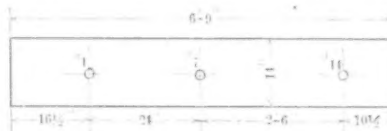


Fig. 6. Sketches of Top Scrap from Armor Plate Ingots, Showing Location of the Holes Drilled to Study Segregation of Copper, Tables 15 and 16.

showing twice as much sulphur and phosphorus as contained in the ladle test (Fig. 5 shows the location of the two holes drilled in the ingots).

TABLE No. 14.

Analysis of ladle test taken while filling the ingot mold.						
Carbon.	Mangan.	Phosphor.	Sulphur.	Silicon.	Copper.	
Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	
0.51	0.64	0.045	0.032	0.119	0.590	
Hole drilled in center of width of ingot 7 inches from bottom.						
Distance from						
surface.	Carbon.	Mangan.	Phosphor.	Sulphur.	Silicon.	Copper.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Surface to 1/2 in.	0.48	0.60	0.040	0.027	....	0.580
1/2 to 1 in.	0.49	0.61	....	....	....	....
1 to 1 1/2 in.	0.49	0.62	....	....	0.110	....
1 1/2 to 2 in.	0.49	0.62	....	0.032	....	0.590
2 to 2 1/2 in.	0.49	0.62	....	....	....	....
2 1/2 to 3 in.	0.50	0.62	....	....	....	....
3 to 3 1/2 in.	0.50	0.62	....	....	....	....
3 1/2 to 4 in.	0.50	0.62	0.043	0.031	....	0.580
4 to 4 1/2 in.	0.50	0.62	....	....	....	....
4 1/2 to 5 in.	0.50	0.61	....	....	....	....
5 to 5 1/2 in.	0.50	0.62	....	....	....	....
5 1/2 to 6 in.	0.50	0.62	....	0.030	....	0.580
6 to 6 1/2 in.	0.50	0.62	....	....	....	....
6 1/2 to 7 in.	0.51	0.63	0.042	....	....	....
7 to 7 1/2 in.	0.51	0.63	....	....	....	....
7 1/2 to 8 in.	0.50	0.62	0.040	0.027	....	0.570
8 to 8 1/2 in.	0.50	0.62	....	....	0.113	....
8 1/2 to 9 in.	0.50	0.62	0.042	0.032	....	0.580
Hole drilled in center of width of ingot 21 inches from top.						
Surface to 1/2 in.	0.48	0.62	0.043	0.027	....	0.590
1/2 to 1 in.	0.49	0.63	....	....	0.110	....
1 to 1 1/2 in.	0.49	0.63	....	....	....	....
1 1/2 to 2 in.	0.49	0.63	0.044	0.031	....	0.590
2 to 2 1/2 in.	0.50	0.63	....	....	....	....
2 1/2 to 3 in.	0.50	0.63	....	....	....	....
3 to 3 1/2 in.	0.51	0.64	....	....	....	....
3 1/2 to 4 in.	0.51	0.64	0.040	0.029	....	0.586
4 to 4 1/2 in.	0.52	0.64	....	....	....	....
4 1/2 to 5 in.	0.52	0.64	0.048	0.033	....	0.595
5 to 5 1/2 in.	0.52	0.64	0.048	0.035	....	0.591
5 1/2 to 6 in.	0.67	0.65	0.080	0.066	....	0.599
6 to 6 1/2 in.	0.75	0.65	0.093	0.073	0.120	0.608
6 1/2 to 7 in.	0.73	0.67	0.080	0.069	....	0.602
7 to 7 1/2 in.	0.70	0.65	0.070	0.060	....	0.600
7 1/2 to 8 in.	0.64	0.64	0.063	0.046	....	0.599
8 to 8 1/2 in.	0.59	0.63	0.055	0.044	....	0.599
8 1/2 to 9 in.	0.58	0.63	0.053	0.042	0.110	0.595

Table No. 15 gives the comparison of the analysis of drillings from a piece of armor plate scrap cut off of the top of an armor plate ingot (Fig. 6) with the analysis of the ladle tests taken from the two open hearth heats

when filling the ingot mold. As the ingot was cast into a sand lined mold 43 x 79 inches and weighed 56 gross tons, and hence cooled very slowly, it is but natural to find considerable segregation in the center of the extreme top of the ingot. The analysis shows that in the central drillings (hole No. 7) there is six and six-tenths times as much sulphur, four and two-tenths times as much phosphorus and two and five-tenths times as much carbon as contained in the steel when casting, whereas the copper has only increased from 0.060 to 0.072 per cent.

TABLE No. 15.

Drillings from—	Copper.	Phos.	Sulph.	Carb.	Mang.	Silicon.	Nickel.
	P. c.	P. c.	P. c.	P. c.	P. c.	P. c.	P. c.
Heat test 2708.	0.062	0.025	0.036	0.20	0.54	0.096	3.058
Heat test 3208.	0.058	0.023	0.035	0.31	0.60	0.112	3.292
Plate hole No. 1.	0.067	0.034	0.050	0.30	0.585	0.110	3.263
Plate hole No. 7.	0.072	0.102	0.237	0.65	0.750	0.135	3.508
Plate hole No. 14.	0.059	0.022	0.024	0.24	0.538	0.097	3.091

Table No. 16 gives a similar instance (see Fig. 7 for location of holes). In this case in the central drillings (hole No. 6), where there is seven and four-tenths times as much sulphur, three and seven-tenths times as much phosphorus and four and three-tenths times as much carbon as contained in the heat tests, the copper has only increased from 0.050 to 0.074 per cent. This ingot also cooled slowly, as it was cast in a sand lined mold 43 x 79 inches and weighed 57 gross tons.

TABLE No. 16.

Drillings from—	Copper.	Phos.	Sulph.	Carb.	Mang.	Silicon.	Nickel.
	P. c.	P. c.	P. c.	P. c.	P. c.	P. c.	P. c.
Heat test 3182.	0.050	0.020	0.030	0.26	0.61	0.114	3.130
Heat test 2680.	0.055	0.023	0.032	0.26	0.69	0.125	3.135
Plate Hole No. 2.	0.059	0.017	0.028	0.29	0.61	0.116	3.211
Plate Hole No. 3.	0.061	0.024	0.052	0.39	0.67	0.112	3.249
Plate Hole No. N.	0.071	0.069	0.144	0.77	0.80	0.148	3.479
Plate Hole No. 6.	0.074	0.081	0.231	1.11	0.82	0.152	3.376
Plate Hole No. H.	0.074	0.083	0.192	1.07	0.81	0.149	3.436
Plate Hole No. 7.	0.073	0.063	0.154	0.83	0.81	0.147	3.477
Plate Hole No. 9.	0.069	0.041	0.078	0.46	0.72	0.138	3.421
Plate Hole No. J.	0.058	0.021	0.029	0.28	0.61	0.118	3.162
Plate Hole No. F.	0.055	0.020	0.022	0.28	0.58	0.102	3.175

Bibliography of Copper in Iron and Steel.

In a review of the contents of 31 "Metallurgies" (1840-1896) mention of the influence of copper on iron and steel was found in 21 of these books. All of the works published since 1890 agree that the opinions as to the deleterious influences of copper in iron and steel are incorrect, or at least very much exaggerated. The following recent quotation from H. H. Campbell's "Manufacture and Properties of Structural Steel," 1896, pages 274, 275, is quoted as it is exhaustive and characteristic:

"The iron made from the ores of Cornwall, Pa., contains from 0.75 to 1 per cent. of copper, and large quantities of rails have been made from this iron alone, but it has oftener been the custom at Eastern steel works to use from 25 to 50 per cent. of this iron in the mixture, the rest being made from foreign ores. Other deposits contain considerable quantities of this element, notably some beds in Virginia, while the ores of Cuba give an iron with about 0.10 per cent. of copper.

"Not only has such metal been put into rails, but into all kinds of steel, both hard and soft, and large quantities have been worked in puddle furnaces and in foundries, so that the miscellaneous cast iron, wrought iron and steel scrap throughout the East is very apt to contain quite an appreciable quantity of copper, and as steel makers will thus forever have this element to handle, it is of pressing importance that its effect be understood. The necessity of such knowledge is one more marked as it is the custom in certain favored districts to intimate that copper is injurious, although definite proof is always lacking.

"Most of the Bessemer steels which are recorded in this book contain from 0.30 to 0.50 per cent. of copper, while much of the open hearth steel is of the same character, and this will be sufficient proof that the best of steel may contain a considerable proportion. If, therefore, it appears from a set of experiments that copper exerts a bad effect then one of two things follows:

"1. That the experiments have left some factor out of the question.

"2. That the maker of good steel has some trick by which he overcomes the enemy.

"It would be a cause for satisfaction if we could

boast that the latter supposition were true, but, as a matter of fact, we have never known that copper injured the cold properties of steel in any way, and it is unnecessary to add that no system has been devised to obviate its influence.

"Hard and soft steels of our manufacture have found their way into all channels of trade, and although many failures have come, as they have everywhere, from high carbon, high manganese or high phosphorus, there have been no cases where it was necessary to invoke the aid of copper. This fact outranks and transcends in value any limited series of tests that might be given. In the same way there is no evidence that copper segregates, experience pointing rather to perfect uniformity. A story has been the rounds of the trade journals of a copper wire which crystallized out in the head of a rail, but, unfortunately, no method is known by which the phenomenon can be duplicated, since such rails might be of great value in electrical work.

"Steel may contain up to 1 per cent. of copper without being seriously affected, but if at the same time the sulphur is high, say 0.08 to 0.10 per cent., the cumulative effect is too great for molecular cohesion at high temperatures and it cracks in rolling. This tearing occurs almost entirely in the first passes of the ingot, so that it is of little importance to the engineer, who is concerned only with perfect finished material. In the purest of soft steels, containing not more than 0.04 per cent. of either phosphorus or sulphur, the influence of even 0.10 per cent. of copper may be detected in the less ready welding of seams during the process of rolling, but ordinarily when the sulphur is below 0.05 per cent. the copper injures the rolling quality very little, even if present in the proportion of 0.75 per cent. In all cases the cold properties seem to be entirely unaffected.

"These conclusions are not founded on any limited series of tests on special alloys; they are the fruits of years of experience in the making of millions of tons of cupriforous steels, and it is quite certain that any baneful influence of this constant companion would have been felt in the many investigations which have been made into the mechanical equation of structural metal."

590 and 594. These three papers were discussed as to copper by A. S. McCreath, W. R. Jones, Wm. Metcalf, Thos. Egleston and C. P. Sandberg.

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List of References on Copper in Iron and Steel Found in 21 Metallurgies of the 31 Examined.

Date.	Author.	Title.	See page—	Copper in—
1852..	Overman, Fredk.	A Treatise on Metallurgy.	485	Cast and wrought iron.
1859..	Lesley, J. P.	The Iron Manufacturers' Guide.	325-8	Cast iron, wrought iron and steel.
1864..	Percy, John.	Metallurgy.	140	Spiegeleisen.
	Percy, John.	Metallurgy.	147-153	Cast iron, wrought iron and steel.
	Percy, John.	Metallurgy.	737	Cast iron.
1868..	Baerman, H.	A Treatise on the Metallurgy of Iron (first edition)	44	Wrought iron and steel.
1869..	Crookes, Wm., and Rohrig, E.	A Practical Treatise on Metallurgy, Copper and Iron.	314	Cast iron, wrought iron and steel.
1869..	Osborn, H. S.	The Metallurgy of Iron and Steel.	124-6	Cast iron, wrought iron and steel.
	Osborn, H. S.	The Metallurgy of Iron and Steel.	909	Steel.
1870..	Crookes, Wm., and Rohrig, E.	A Practical Treatise on Metallurgy, Steel, Fuel, &c.	33	Cast iron, wrought iron and steel.
	Crookes, Wm., and Rohrig, E.	A Practical Treatise on Metallurgy, Steel, Fuel, &c.	111	Steel.
1873..	Overman, Fred., and Fesquet, E. E.	The Manufacture of Steel.	258	Wrought iron and steel.
1874..	Greenwood, Wm. H.	A Manual of Metallurgy.	51	Wrought iron and steel.
	Greenwood, Wm. H.	A Manual of Metallurgy.	64	Cast iron.
	Greenwood, Wm. H.	A Manual of Metallurgy.	152	Steel.
1884..	Greenwood, Wm. H.	Steel and Iron.	59	Cast iron, wrought iron and steel.
	Greenwood, Wm. H.	Steel and Iron.	396	Steel.
1887..	Phillips, J. A., and Bauerman, H.	Elements of Metallurgy.	130	Wrought iron and steel.
1890..	Baerman, H.	A Treatise on the Metallurgy of Iron (sixth edition).	50	Wrought iron and steel.
1891..	Howe, M. H.	The Metallurgy of Steel.	82-3, 142	Cast iron, wrought iron and steel.
	Howe, M. H.	The Metallurgy of Steel.	251-B	Wrought iron.
	Howe, M. H.	The Metallurgy of Steel.	368-9, 417	Steel.
1891..	Vosmaer, A.	The Mechanical and Other Properties of Iron and Steel.	109-112	Cast iron, wrought iron and steel.
1894..	Cremer, J. H., and Bicknell, G. A.	Chemical and Metallurgical Hand-Book.	269	Cast iron.
1894..	Phillips, H. Joshua.	Engineering Chemistry.	32	Steel.
1894..	Roberts-Austen, W. C.	An Introduction to the Study of Metallurgy.	34-5	Steel.
	Roberts-Austen, W. C.	An Introduction to the Study of Metallurgy.	98	Steel.
1894..	Thurston, R. H.	Iron and Steel, Part II of Materials of Engineering.	279-80	Cast iron, wrought iron and steel.
1895..	Horns, A. H.	Principles of Metallurgy.	70-71	Wrought iron and steel.
1895..	Richards, R. H.	Notes on the Metallurgy of Iron.	125	Steel.
1896..	Campbell, H. H.	The Manufacture and Properties of Structural Steel.	13-14, 274-276	Steel.
	Campbell, H. H.	The Manufacture and Properties of Structural Steel.	295-297, 298	Steel.
	Campbell, H. H.	The Manufacture and Properties of Structural Steel.	364-366, 372	Steel.
	Campbell, H. H.	The Manufacture and Properties of Structural Steel.	47-361	Wrought iron.

The following list of references to copper in iron and steel were noted in a careful search of 323 volumes of the standard technical journals and transactions of scientific societies covering dates 1869-1899:

Copper in Rail Steel.

C. B. Dudley, *Trans. American Institute Mining Engineers*, vol. 7, 1878-9, pages 172-201.

C. B. Dudley, *Trans. American Institute Mining Engineers*, vol. 7, 1878-9, pages 202-205.

C. B. Dudley, *Trans. American Institute Mining Engineers*, vol. 9, 1880-81, pages 544, 546, 547, 567, 568, 589,

vol. 13, page 205, abstracted in *Journal Iron and Steel Institute*, No. 1, 1884, page 248.

Influence of Copper on the Properties of Wrought Iron and Steel.

M. Euverte, *Comptes Rendus de la Société de l'Industrie Minérale*, 1884-5, pages 85, 86.

Influence of Copper on the Recalescent Points of Steel.

F. Osmund, *Comptes Rendus*, 110, pages 242-5, abstracted in *Journal Chemical Society*, vol. 58, 1890, pages 566, 567.

Cuprous Sulphide in Pig Iron.

W. Stahl, Berg und Hullen, mannesche Zeitung, vol. 49, pages 99, 100, abstracted in Journal Iron and Steel Institute, No. 1, 1890, page 363.

Copper Not Injurious in Rail Steel.

The Iron Age, January 30, 1890, pages 169, 170.

The Segregation of Copper in Steel.

A. Pourcel, Trans. American Institute Mining Engineers, vol. 22, 1893, page 107.

T. W. Hogg, Journal Society Chemical Industry, vol. 12, 1893, page 237.

Cam Shaft with 0.12 Per Cent. Copper.

H. Wedding, Stahl und Eisen, vol. 15, pages 507-9, abstracted in Journal Iron and Steel Institute, No. 2, 1895, pages 545, 546.

The Intentional Addition of Copper to Steel.

Vosmaer's "Mechanical and Other Properties of Iron and Steel," 1891, page 112.

F. Lynwood Garrison, Journal Franklin Institute, August, 1891, page 123.

James Riley, Journal Iron and Steel Institute, No. 1, 1890, page 123.

R. A. Hadfield, "Mineral Industry," 1895, page 427.

Howe's "Metallurgy," pages 368, 369 (Holtzer's 3 to 4 per cent. copper steel).

English patent, No. 16,568, November 14, 1888, to Henri Schneider. See Journal Society Chemical Industry, vol. 9, 1890, page 193.

English patent, No. 16,569, November 14, 1888, to Henri Schneider. See Journal Society Chemical Industry, vol. 8, 1889, page 898.

United States patent, No. 292,517, December 3, 1888, to Henri Schneider.

United States patent, No. 292,519, December 3, 1888, to Henri Schneider.

Engineering and Mining Journal, October 11, 1890, vol. 50, page 426, gives a review of above patents taken from the *Ironmonger*. Another review may be found in *The Iron Age*, vol. 35, 1890, page 168.

Representatives of many national associations of manufacturers and merchants met in Chicago on the 23d inst. for the purpose of approving a bill which will be sent to the next Congress calling for the extension of the powers of the Interstate Commerce Commission so that its orders may be made mandatory on the railway authorities. The bill demands, further, a uniform classification of rates and the kinds of freight. The proposed measure will be presented to the Senate by Senator Cullom. It has been drafted under the approval of the members of more than 30 national industrial associations and of members of the Interstate Commerce Commission, and is supported by a number of traffic officials. This fact, it is asserted, assures relief which has been sought without success since 1890 through lack of harmony in the ideas of shippers and their various organizations.

The National Contracting Company of New York City have commenced the work of constructing the new wheel pit for the Niagara Falls Power Company at Niagara Falls. Walter McCulloh has been appointed local manager of the work and the big contract will be carried out under his supervision. The pit will be over 400 feet long, about 168 feet deep and 20 feet wide. The contract for building the tunnel to connect the new pit with the main tunnel has been sublet to A. C. Douglass of Niagara Falls. This connecting tunnel will be the same size as the main tunnel and about 750 feet long. It will take all of 18 months to complete the pit and millions of dollars will be expended on it.

The result of the trial of W. H. Evans of Ellwood, Pa., vice-president of the Fifth District of the Amalgamated Association of Iron, Steel and Tin Workers, was made public Saturday. President Shaffer of Pittsburgh charged Evans with hindering the work of the organization. Not long since Mr. Evans was dismissed from the employment of the tin plate company of Ellwood and a strike followed. President Shaffer ordered the men back to work and it is alleged that Evans then became antagonistic to the organization. The jury upheld the decision of President Shaffer and suspended Evans for six months.

The prospectus has been issued in London of the Colt Gun & Carriage Company, Limited, with a capital of £500,000, of which £250,000 have been offered for subscription at par. The company are to acquire the patent rights from Colt's Patent Fire Arms Mfg. Company of Hartford for the principal European countries and the exclusive right to sell in all countries of the world except the con-

tinents of America other than Canada for 14 years from July 3, 1895. The new company acquire the patent of the gun carriage of the Earl of Dundonald. The Lancashire Finance Association, Limited, are the promoters.

The Brooklyn Navy Yard Machine Contracts.

WASHINGTON, D. C., November 28, 1899.—It is stated at the Navy Department that the work of awarding the contracts for tools and machinery for the Brooklyn Navy Yard, bids for which were opened several weeks ago and published in detail in these columns, may not be completed before January 1. A board has been appointed to consider the bids, and each proposal is being carefully analyzed with a view to determining accurately the relative efficiency of each tool or machine upon which a bid was made. The Department officials state that not only is this the largest requisition for tools and machines ever advertised, but that never before have manufacturers put in so many alternative specifications. In numerous instances manufacturers found that the specifications seemed to cover special builds of machinery which could not be furnished by the trade generally, but which, it is claimed, are no better than other machines which may be built by any concern having adequate facilities. It has been found necessary to make a careful comparison in all these cases, and it is stated at the Department that where an alternative tool is found to be as good or better than that specified, and the price is less, the lower cost will govern.

W. L. C.

Cheaper Acetylene Gas Promised.—A process by which calcium carbide can be continuously produced more cheaply than by the process at present in use is reported to have been discovered by Professor Freeman, who has been conducting a series of experiments at the Armour Institute, Chicago. In the new process a huge arc lamp inclosed in brick work in the interior of a furnace was employed. The upper electrode of the lamp was hollow, and through it was fed a powder composed of 60 per cent. common lime and 40 per cent. coke. This powder being carried through the upper carbon directly into the electric flame, was melted by the intense heat; all the power of the electric plant of the institute was turned into the electrodes, and calcium carbide in a molten state ran away from the machine. It was estimated that the carbide was produced at a cost of $\frac{1}{2}$ cent per pound. According to Professor Freeman the great gain indicated was due to the continuous production of carbide—in a word, the demonstration that it can be produced continuously by feeding the ground lime and carbon into the furnace.

The Steel Ball Company.—The Steel Ball Company, manufacturers of balls for all kinds of bearings, have removed their general offices to their new factory at Claremont and Austin avenues, Chicago. They established their business in the manufacturing building at 39 West Randolph street, taking modest quarters, and continued there until the growth of their trade required much greater facilities. They now occupy a building covering a ground space of 120 x 120 feet, two stories high, devoted exclusively to their purposes. The equipment of machinery is on an extensive scale, as indicated by the installation of a 450 horse power engine. All sizes of steel balls will be produced up to 4 inches.

The Carnegie Steel Company of Pittsburgh have received a contract from the Merchants' and Manufacturers' Bank of that city for 83 tons of harveyized armor plate, with which to construct a vault. The inside measurements will be 6 feet 6 inches deep, 7 feet 6 inches wide and 8 feet 2 inches high, and the outside measurements 7 feet 11 inches deep, 8 feet 3 inches wide and 9 feet 2 inches high. The thickness of the door plate will be 10 inches, and of the front plate $12\frac{1}{2}$ inches. It will be the second armor plate vault in Pittsburgh, the first one being in the new building of the Union Trust Company.

The committee of the Amalgamated Association of Iron, Steel and Tin Workers which went to Chicago last week to consult officials of the American Tin Plate Company, for the purpose of fixing a wage scale for the plate mills for November and December, found that the average price of tin plate in September and October did not warrant any advance being given to the men. It is expected that when the next bi-monthly wage conference is held the men will receive an advance in wages for January and February.

The molders in the iron foundries of Racine, Wis., went out on strike on the 23d inst. demanding a minimum daily rate for floor molders of \$2.75 and bench molders \$2.50 and 10 per cent. advance on piece work.

The History of a Crucible Steel Plant.

A series of articles have been contributed by English and American authorities to *London Engineering* on the subject of American competition. One of the last is that of William Metcalf, whose history of a crucible steel manufacturing concern is interesting:

In 1865 three young men, a Sheffield lad, a hammer man by trade, a mechanical engineer and a business man, the latter two Americans, built 12 melting holes and three steam hammers; in January, 1868, they were joined by another young engineer, and 12 melting holes and one 12-inch train of rolls were added to the plant. The total invested capital was \$100,000.

About 1870 the Siemens regenerative furnace was introduced into Pittsburgh, and shortly after these young men tried one and found it efficient and economical. In less than three years they added more furnaces, until they had invested in furnaces and royalties \$50,000 without adding anything to the capacity of the plant except the equivalent of 12 melting holes.

In about five years the saving in fuel wiped out the \$50,000, so that the change had then cost nothing.

There was an enormous gain in the efficiency and in the behavior of the men that could not be figured in money; it was a great advantage, however, and it continues to this day. It was soon found that the best American iron of that day would not make quite as good steel as the best Sheffield brands. Then one of the young men went over to Sweden, only to be told that it was impossible to buy a pound of the best Dannemora iron; the Sheffield steel men had bought it all for five years, with an option on the next five years, the owners being bound by strict contracts not to make any more iron nor to sell any ore. After a thorough visit to the mines and forges our Yankee went back to Stockholm and told his iron merchants that the chain seemed to be complete, but that there was a link loose and he wanted them to find it. There were many owners of the mines and one obscure owner with a disused forge had a right to some of that ore, and he wanted them to find that man and get him to make them some iron.

At first he was laughed at heartily and then promised that a search should be made for his mythical man and forge. Within a month of his return home word came that the man with a forge had been found, and that for a three years' contract he would furnish an iron guaranteed to be equal to the famous double bullet hoops L or other highest class brands. The contract was made. At the end of three years it was continued and the quantity was increased; at the end of the second three years all of the great Dannemora brands, with perhaps one exception, were for sale in the open market.

Our young Yankee found the steel works of Sheffield as hermetically sealed as the Dannemora business, the holders of the keys being apparently unconscious that their most expert workmen were swarming over to the States and that many of them were offering for sale copies of their mixtures for all of their brands. Our young men did not buy the mixtures, they bought the iron and employed the men. In 1876 Dr. C. W. Siemens visited our Yankee in Pittsburgh and examined his plant. He noticed some nice clean nut coal on the producers and asked its cost—75 cents, or 3 shillings, a ton astonished him. He next asked the quality and price of some iron he saw and was told that it was about equal in quality to the ordinary grades of Swedish melting iron and cost about £9 a ton where it lay. Then he asked, "What do you want of a tariff when you have such splendid cheap fuel and good cheap iron?" He was told that it was for defense and out of pure benevolence and love for our British cousins; for defense, because the cheapest and best standing army was a nation of well paid and contented citizens; for benevolence, because if the tariff were removed and our men were brought to the level of Sheffield wages Sheffield would starve and we did not want to starve our relatives. At the close of his visit Dr. Siemens placed his hand on the Yankee's shoulder, a strange and rather sad expression was on his face, and he said, "My young friend, I have been very much interested to day. It pains me far more than I can tell you to have to come more than 3000 miles from my home to find the best application of principles that I have spent my whole life in developing. Your plant is 50 years ahead of anything in Sheffield."

In regard to the workmen it is safe to say that a more hidebound set of men never left England. "You mustn't do this" and "you cannot do that," "this is impossible" and "such a thing as that was never heard of," &c. After ten years or so you might ask the most stubborn of them to do the most apparently impossible thing and the answer would come, "I'll try it." Why? It must be in the air. In regard to iron the best Dannemora still maintains its pre-eminence for some special purposes, but the great bulk of American steel is now made of American iron only slightly if at all inferior to the Dannemora and costing less than one third as much. In the 60's axe steel and fine edge steel cost about 16 cents a pound; in the

90's axe steel sold for 4 cents a pound and the axe makers say the steel is good, and that they are inspecting and testing their tools more rigorously than ever before. It is proper to say that the concern referred to are now prominent, successful and wealthy.

Wireless Telegraph Competition.

Last week a charter of incorporation was granted, under New Jersey laws, to the Marconi Wireless Telegraph Company of America, with an authorized capital of \$10,000,000. The company, it is announced, are incorporated to purchase and acquire various inventions and discoveries and letters patent connected with the business of communication by means of wireless telegraphy, and especially to use the Marconi patent. The company are also empowered to construct and operate lines for using this invention over land and sea. The incorporators are Guglielmo Marconi of London, England; Isaac L. Rice and August Belmont of New York; Clement A. Griscom of Philadelphia, and Robert Goodbody of Paterson, N. J.

It is also announced that another company, to be known as the International Wireless Telephone & Telegraph Company, will shortly be incorporated in New Jersey, with a capital of \$5,000,000, to acquire and operate under the wireless telegraph patents of Professor Dolbear of Tufts College. The International Company, it is said, will have their headquarters in London, and will oppose the Marconi Company in every country in which the Marconi system is to be used. Their first move will be to enjoin the last named company from using the wireless system, in which the International Company claim prior rights.

An Electrolytic Method of Sharpening Files.

The *London Engineer* prints the following article:

Those who are accustomed to use files know only too well how quickly they lose their cutting edge, or become clogged, when employed for certain classes of metals and alloys. A file card will clean a file in many cases with difficulty, but will not sharpen the cutting edges. The only process that has been successfully applied to the sharpening of files, up to the present, is Tilghman's steam sand blast. Fine sand is projected on the file with a steam pressure of 150 pounds through rubber hose fitted with cast iron nozzles. The harder the surface to be operated on the greater is the resistance offered, and the more vigorous is the action of the sand. The action of the sand is to cut away the backs of the file teeth, thus forming a straight level on the teeth back and giving a new cutting edge. The process occupies from three to five minutes.

It occurred to Sherard Cowper-Coles that cutting edges might be readily sharpened by dissolving off electrolytically a thin and even film of the steel. A large number of experiments were made for the purpose of determining the best conditions. The effects of various current densities and electrolytes upon the cutting edges of the files were recorded by means of impressions taken on lead foil, and also by taking micro-photographs, none of which can be reproduced. Another method for recording the results obtained was to take gutta percha molds, from which electrotypes were produced. Current densities were tried, varying from 1 to 500 amperes per square foot, and with variations of time from five minutes to 60 hours. A large number of electrolytes were also experimented with, including cyanide of potassium, ferric chloride, ferric sulphate and solutions of sulphuric acid of different strengths. The best results were obtained with a solution of ferric chloride with high current densities.

Kempe, in his "Engineers' Year Book," recommends the following: "The files are first cleansed with hot water and soda. They are then brought into connection with the positive pole of a battery, in a bath composed of 40 parts sulphuric acid and 1000 parts water. The negative—zinc—pole of the battery is connected to a copper spiral surrounding the files, but not touching them. This arrangement is the result of practical experience. When the files have been in the bath for ten minutes they are taken out, washed and dried, when the whole of the hollows will be found to have been attacked in a sensible manner; but should the effect not be sufficient, the files are replaced in the bath for the same period as before. Sometimes two operations are necessary, but seldom more.

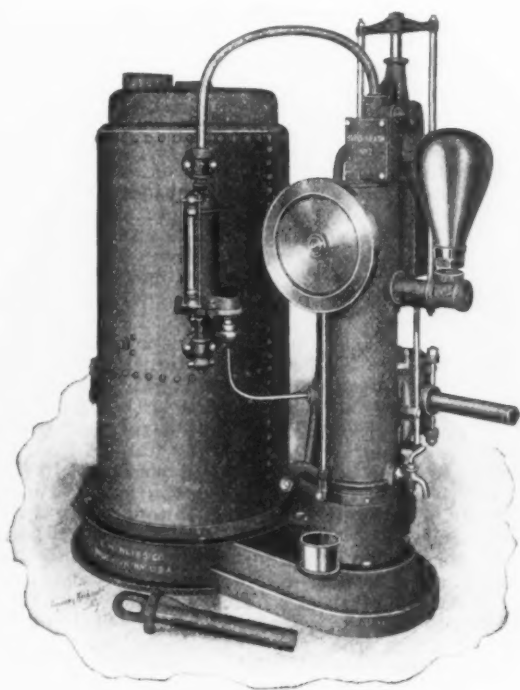
Three lodges of the Amalgamated Association of Iron, Steel and Tin Workers have been organized recently, two at Granite City, Ill., and the third at Elwood, Ind.

A process of smelting iron ore by electricity is to be developed by the Hatch Smelting Company, recently organized at Green Bay, Wis. A satisfactory test of the process is said to have been made at Crystal Falls.

The Bliss-Heath Low Pressure Pumping Engine.

We illustrate the Bliss Heath vacuum or atmospheric pumping engine, built by the E. W. Bliss Company, 11 Adams street, Brooklyn. This pump is designed to raise water to tanks for furnishing a supply to the upper stories of buildings. It consists of a double acting vacuum or atmospheric engine operating a double acting pump, a tubular steel boiler for a pressure of only $1\frac{1}{2}$ pounds, a surface condenser and a single acting air pump.

The motive power of the engine is the normal atmospheric pressure (14.7 pounds to the square inch) brought to bear upon the power piston by means of a vacuum formed in the power cylinder, alternately above and below the power piston. The air is expelled from the power cylinder by admitting steam without appreciable pressure, after which the steam itself exhausts into the surface condenser, in which a constant vacuum is maintained. Steam is then automatically admitted into the power cylinder, alternately above and below the power piston, for either the up or down stroke, breaking the vacuum and giving the piston the required impetus. The principle is the same as that of an ordinary condensing steam engine.



THE BLISS-HEATH LOW PRESSURE PUMPING ENGINE

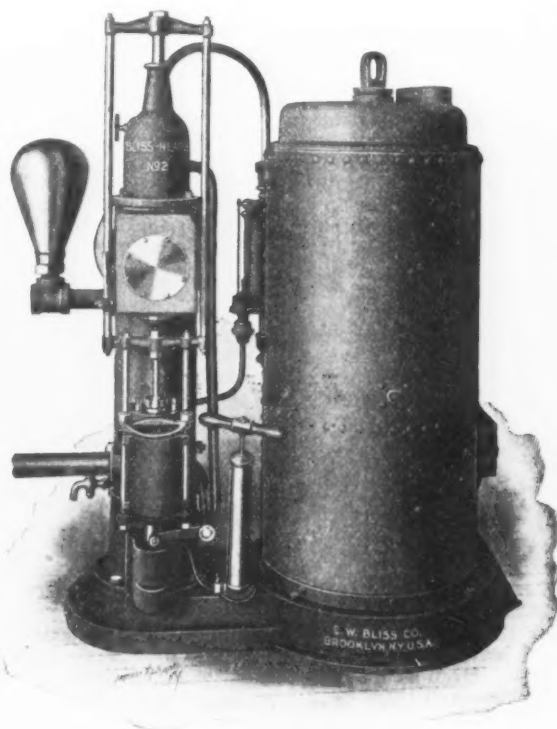
except that to operate this engine only enough steam is required to be generated to balance the normal atmospheric pressure. The surface condenser and the air pump perform their usual functions.

The generator or boiler is exceedingly simple, having at the top a large opening into which fits a light cover or safety valve, like that of a tea kettle. A very light pressure of steam suffices to lift the cover, affording a vent and making the generator absolutely safe from danger of explosion. The generator is fed automatically by means of the water tank pressure. On account of the freedom from explosion of this engine, no licensed engineer or skilled mechanic is required to operate it. Coal or wood may be used as fuel. The engine can be operated in connection with an ordinary low pressure house heating steam boiler, thus making the cost of operation very low during the steam heating period. During the warm weather, and all the year where buildings are not heated by steam, the small steel boiler furnished with the engine provides ample power at low cost. The engine is self oiling, and steam and water being themselves good lubricants, there is no "gumming up" to clog the machinery and impair its efficiency. Its wearing parts are heavy, durable, simple, reliable and interchangeable. An important feature of the pump is that it never "pounds," and is practically noiseless. The pump is made at present in a number of sizes, from 300 up to 3000 gallons per hour 50 feet high, or corresponding quantities a greater or less height than 50 feet. The makers are designing larger sizes suitable for railroad tank pumping, &c.

The Albion Power Company.

The Albion Power Company have recently completed their generating station at Waterport, N. Y., and their aluminum transmission line to the sub station in the village of Albion. This company have a capital of \$50 000, and were organized to develop the power of the Oak Orchard and Otter Creeks, at Waterport. At that point the Oak Orchard Creek runs through a gorge having quite high banks. In this gorge the company have constructed a dam 12 feet high, which sets the water back fully $\frac{3}{4}$ mile. At the east end of the dam the company have erected their generating station, where 400 horse-power is developed under a head of about 18 feet, the head in addition to the height of the dam being obtained by means of the tail race. The turbines are set right in the open flume on a horizontal shaft. These wheels are two in number, and were made by J. & W. Jolly of Holyoke, Mass. One wheel has a capacity of about 250 horse-power, while the other is of about 175 horse-power. They discharge through a quarter turn and draft tube outside the flume.

In the station the company have installed one Stanley three-phase, alternating current dynamo, inductor type, having a capacity of 150 kw. when operated at a speed of



600 revolutions per minute, and also one Stanley dynamo of the same type of 100 kw. capacity when operated at 900 revolutions per minute. The voltage at which current is generated is 6600, and the generators feed directly to the transmission line without the use of transformers. The generating station also has two exciters and the necessary switchboard. The larger generator is belted to the larger wheel and the smaller generator to the smaller wheel.

The distance from Waterport, where the generating station above described is located, is $6\frac{1}{2}$ miles, and for this distance a three-phase transmission line has been erected. At the start aluminum wire about $\frac{1}{4}$ inch thick was used for transmission purposes, but owing to the fact that it was rather hard drawn several breaks occurred, and now the company are replacing this wire with aluminum cables having seven strands in each cable, which will give the line greater strength. The transmission line follows the highway from Waterport to Albion.

When they started business the Albion Power Company purchased the old plant of the Albion Electric Light Company, and are now using the Albion station as the sub-station of their plant. In this sub station they have installed three Stanley static transformers having a total capacity of 200 kw. They transform the current as it comes from the line at 6000 volts to 1100 volts. In the sub-station has also been installed a 75 horse-power inductor type dynamo for service as a synchronous motor designed to be operated on 1100 volts, three-phase; also a small exciter and a small motor. The 75 horse power motor operates a Brush arc light machine, and the station is so ar-

ranged that the motor and arc machine may be operated by the steam plant in case of accident to the generating plant or transmission line. The business part of Albion has been divided into three districts, in each of which the Albion Power Company have installed three 300-light transformers, on the street, and connected in multiple, stepping down to 110 volts. Each of these districts is connected to one leg of three-phase line. There is also a three-phase line running around the outskirts of the village, from which all power and outside lighting is taken. The company furnish power to several small consumers. The plant is most interesting in portraying the benefit that may accrue to any place through the development of any source of power lying within a few miles of the place where the consumption of the current is desired. No doubt there are many places throughout the country where electric power in a similar amount might be obtained by means of proper development. Many cities and villages are coming to realize the value of such development, and small generating plants are becoming quite a feature in the development of the various resources of many localities.

Wallace C. Johnson, chief engineer of the Niagara Falls Hydraulic Power & Mfg. Company, is chief engineer and general manager of the Albion Power Company.

Pacific Coast News.

SAN FRANCISCO, November 20, 1899.—There is no question that the matter most prominently before the hardware trade at date of present writing is not the sale of goods and the returns of profit on them, but the all absorbing themes of postage stamp and graded rates and carload and less than carload freight rates. It is the one that absorbs the attention of the entire mercantile community of the Pacific Coast. The developments during the sitting of the Interstate Commerce Commission at St. Louis make this plain to the meanest comprehension. St. Louis, Chicago, Milwaukee and other Middle West centers of trade not only wish to hold their own trade in their own field but to fight the Pacific Coast jobber for the trade of this section. The Middle West jobbers wish to reach especially the retail trade of the West. On this subject a prominent merchant says: "We are not seeking to divide up the trade of the Middle West with the Middle West jobber. All we seek is to hold our own trade. Some of us have spent a lifetime in building it up. The gist of the complaint of our St. Louis friends is that they are shut off from the trade of California. I fail to see where this is an injury. What sympathy would Pacific Coast jobbers meet with in any other part of the United States if they should seek to change railroad freight rates in order to capture the trade of the Middle West or of the Atlantic States? What sympathy would they deserve? Is not their own territory large enough for them? Why do they not do their best to develop it and leave us on the Pacific Coast here alone to develop ours? Even as it is they allow that they have not lost in trade though they have lost in profits. Some of them claim to be able to retain their old trade, and I do not doubt that this is so, for they have the same chance in carload lots, as we have here; that is, the same chance to sell. Their complaint is that they are obliged to ship in carload lots, to have resident agents here, mayhap to rent a store, pay taxes and help to support the governments of the city and State. We have to do the same and I do not see why they should be exempt. Somebody must do this and they who have most means must pay the most. If the business of the Pacific Coast jobbers should be swept away the burden of taxes would fall altogether on the retail dealers. They would make no more money out of their business than they do now, but their expenses would be vastly increased. The retailer can then in no wise be benefited by the proposed charge, although that is part of the contention of the jobber of the Middle West. Take San Francisco as an example. Most of the personal property roll is made up of the assessment of stocks in the hands of merchants and manufacturers. Sweep away their trade as it is now and one of two things must happen. Either they would be forced to enter the field of retail trade themselves, driving out the small dealers, or they would have to remove from the field in great part and the retailer, as far as tax burdens are concerned, would have to meet their present disbursements to the city and State. I question whether many of the retailers ever looked at the matter from this point of view. The farmers have in one instance taken the part of the Middle West jobber in the present fight, but these farmers have no more use for the jobber of the Middle West than they have for his brother of the Pacific Coast. They belong to the class that is always talking about doing away with the middleman, and they would do away not only with jobbers but with retailer as well. They forget that their logic, if strictly construed, would bring about a socialistic condition of society in which there would be no special use for farmers either. Their help have as much right to

declaim against their profits as they have against the legitimate profits made by the jobber either East or West. I speak in this way because some of our antagonists have appealed to the moral and sympathetic side of the matter. The poor retailer must be protected against the grasping greed of the Pacific Coast jobber. It is not so long since the retailers asked the jobbers of the coast to protect them against retail sales by large houses and the jobbers officially acceded to the request. Our fight is the fight of all. But in this matter we go on our undoubted rights. We have a right to postage stamp rates and to lower figures for whole carload lots. We buy wholesale and if we can obtain lower rates by so doing the law should protect us in that right. Then even our antagonists allowed that sea competition must be an element in fixing freight rates, and that is all we ask—our undoubted right to obtain the rates that our favorable position allows us to obtain. It is not our fault that the St. Louis jobber is shut out from the sea. The Almighty so decreed it from the beginning. This represents the views of the jobbing trade about as nearly as they can be represented. In a word they say: "This is our territory and we are going to keep it. You have your own territory and let us have ours." The gentlemen who represented the jobbers at St. Louis left there for New York at the conclusion of the session of the Interstate Commerce Commission.

The weather in this State has been changeable for the past two weeks, alternating fine and rainy. There has been abundance of rain and agricultural interests are everywhere prospering. There is a great breadth of land being put under the plow. All this tends to give courage to our business men and those who in city and country have improvements to make. This and the still heavy purchases of the United States Government keep up the volume of sales wonderfully, and the result is that the clearing house exchanges are about 35 per cent. in excess of what they were a year ago at the corresponding time. The exchanges for the past week have exceeded \$25,000,000 and there does not seem to be any indication of a falling off in them. Of course in the ordinary state of things the fall business should, as fall business, cease in a couple of weeks, but there is no telling what a year like the present may bring forth. We have had years when the demand for goods did not cease until well over into the new year.

There have been heavy exports of machinery, hardware and other goods of like character during the past couple of weeks, especially to the Hawaiian Islands; in fact the total exports to the group during the past week exceeded \$500,000, or nearly double that of the best week during the present year.

With the exception of the continued weakness in pig tin there has been little movement in the prices of any leading article. We still continue to import pig iron from China and the "China" in her last trip here brought 224 tons. The "Cambuskenneth" has also 200 tons, making quite a considerable quantity from this source in a couple of weeks. The "Doric" had 1148 ingots of Straits tin; the "Seafarer" had 5681 bundles and bars of Belgian iron; the "San Juan" on her last trip brought 3268 packages of iron and steel; the "Cyrus Wakefield" had 21,863 packages of iron, steel, iron pipe, steel rails, horseshoes, &c., from New York, besides 500 kegs of nails, and we have had also our quota of receipts from the East via Vancouver and the Canadian Pacific.

Some heavy purchases of clipper ships have been lately made for our trade with the East and talk of the new 10,000-ton steamers is becoming quite common. It is now claimed they will be ready for delivery by next March.

J. O. L.

The Manufacture of Steel Castings.

At the last meeting of the Manhattan Association of Engineers J. E. Fletcher of Sheffield read a paper on "The Manufacture of Steel Castings." The chief difficulty in the manufacture of steel castings, he remarked, was in connection with their contraction. The contractional coefficient being, roughly, double that of cast iron, very special means were necessary in order to release castings of large dimensions rapidly and successfully while cooling. Mr. Fletcher then proceeded to examine the designs of characteristic castings for hydraulic machinery, engines and boilers, mill work and electrical machinery, pointing out where difficulties in manufacture occurred, and suggesting how such troubles might be overcome, his remarks being illustrated by a number of diagrams. In connection with hydraulic cylinders, he recommended that these should always be cast mouth upward. By this means the weakest portion—viz., the closed end of the cylinder, was likely to be perfectly sound, as it was thus subjected to the pressure of the whole of the cylinder body and casting head above it. Again, the crystallization of the steel in the cylinder base was regular and the contraction more uniform. With regard to the casting of engine, boiler and pipe connections, the author said that in the navy the introduction of the Belleville boiler

had led to the use of steel castings of most intricate form, some of which had been produced successfully, but with others waster after waster had rewarded the founder's efforts. He believed he was perfectly correct in saying that on several occasions the completion of war ships had been delayed simply on account of the difficulty in obtaining delivery of steel boiler castings of the intricate order above mentioned.

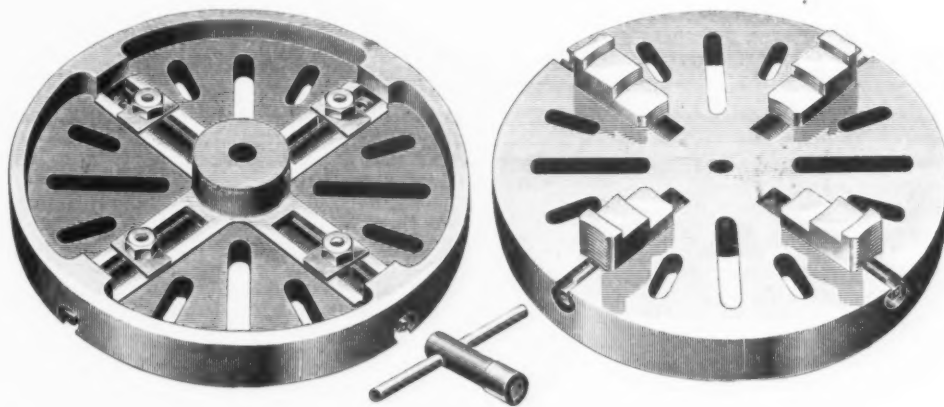
From experience gained, the following conclusions have been arrived at: Pipes, tees, bends and valve bodies of over 4-inch bore should not be less than $\frac{5}{8}$ inch thick; under 4-inch bore, $\frac{1}{2}$ inch; 6 to 8 inches, $\frac{3}{4}$ inch; 8 to 10 inches, $\frac{7}{8}$ inch; 10 to 12 inches, 1 inch. The holes in all flanges should be drilled, the junction of two boxes should be well rounded, and the coupling flanges kept as small as possible. In castings for locomotive purposes several articles had given considerable trouble, notably wheel centers, motion plates, and bogie frame castings of more or less intricate form. The greatest difficulty was in the production of wheel centers having heavy balance weights, the mass of these weights in many cases being enormously disproportionate to the remaining portions of the wheel. It was true that steel founders had overcome the difficulty partially, and such wheels could be cast free from flaw, but it was extremely doubtful whether they were ever free from the severe strains set up during contraction, however well the castings were annealed. Dealing with the casting of spur and bevel wheels for millwrights' use, Mr. Fletcher said the thickness of arms and rims should be as nearly as possible uniform; H-section arms were best, neither the X nor elliptical sections being satisfactory. It was advisable to core out the steel at the end of the arm web, leaving the side flanges to transmit the

Uniform Terms of Sale.

The Conference Committee of the four Eastern stove associations, comprising the Stove Founders' Association of Eastern Pennsylvania, New York City Stove, Range & Furnace Manufacturers' Association, New York State and Northern Pennsylvania Stove Manufacturers' Association, and the New England Stove Manufacturers' Association, held a meeting on Wednesday at the Waldorf-Astoria Hotel, New York City. The object of the meeting was to discuss the subject of terms of sale for the purpose of making terms uniform throughout all of the Eastern States. In view of the fact, however, that some of the associations have not taken definite action and there is a variation in terms at present in force, it was decided, in default of identical terms throughout the entire territory, that all manufacturers should observe the terms in each other's territory, this conclusion to be reported to the several associations by their representatives.

The Skinner Lathe Face Plate.

As a result of the efforts of American lathe manufacturers to dispose of their product in Europe we have come to be more or less familiar with the cutaway tail stock, which has been pretty generally adopted by lathe builders in response to the call for it by their customers abroad. Other changes in attachments to lathes for foreign customers have been demanded, among which is the call for



THE SKINNER LATHE FACE PLATE.

power. The radius of the arm end next the rim should be as large as possible. Wheels over 4 feet 6 inches diameter should have their shaft bosses or eyes split and afterward hooped. The Continental plan of adopting an odd number of arms was recommended, such wheels, as a rule, being more truly circular than wheels having an even number of arms. Wheels in halves should be cast in one piece, afterward being sawn or drilled apart at the rim. The arms of bevel wheels should be of H-section, and where the wheels had very flat faces the rims should be stiffened. Steel wheels with disk centers were not to be recommended, fracture in cooling being of constant occurrence.

In conclusion the author remarked that in considering various representative castings the question of crystalline structure played an important part. In fact, wherever in a casting weak zones of crystallization occurred, there was a risk, to a greater or less extent, of fracture. This risk might be minimized by annealing, only he was strongly of opinion that all steel castings should be well annealed. The demand for very mild steel castings giving high ductility had in some cases been carried too far, intricate forms of rapidly changing section, when cast in such mild steel, being very likely to fail; indeed, it might be taken as certain that the mild qualities of steel developed cracks more readily than the harder ones. The production of steel castings would be carried on more successfully as the laws of cooling in relation to crystalline structure became more widely known. Steel founders, with all other metal founders, were seriously hampered by the appalling general ignorance (on scientific subjects) of the molders. It was high time the molders realized their position in this respect and applied themselves to the task of gaining knowledge respecting metallurgy, heat and machine design. With intelligent molding, suitable steel, and a grasp of the laws of cooling and crystallization when dealing with the releasing and annealing of castings, steel machine details, if carefully designed, would be perfectly produced in the future.

adjustable jaws for use on lathe face plates. In Europe the practice is to use the large face plate on nearly all varieties of work. Instead of removing the large face plate and putting a chuck on the spindle, the European machinist prefers to put a set of jaws on his face plate for doing his chucking work. To meet this demand the American lathe builders have been obliged to furnish their large face plate with adjustable jaws, and the illustration herewith is of a plate with jaws, built by the Skinner Chuck Company of New Britain, Conn. While the demand for American lathe chucks and drill chucks from Europe is larger now than at any previous time, the European trade still insists on having these plates furnished with a large portion of the lathes. This will probably not become popular with the American machinist, as the cutaway tail stock has, for the reason that a man can change his lathe plate for a chuck more quickly than he could attach the jaws to a face plate, which at best is a poor substitute for an independent four-jaw chuck.

The Louisville Iron & Bolt Company.—The business of the Anderson Iron & Bolt Company, Anderson, Ind., is to be removed to Louisville, Ky. It will be conducted by a new corporation named the Louisville Iron & Bolt Company, having an authorized capital stock of \$150,000. The incorporators of the new company are L. S. Taylor of Anderson, manager of the old company, and S. S. Bush, C. A. Parker, Willis P. Davis and Clarence Dallman of Louisville. The officers selected are S. S. Bush, president; L. S. Taylor, vice-president and general manager, and C. A. Parker, secretary and treasurer. The reason alleged for the removal is the diminishing supply of natural gas on the old company's property at Anderson. A much larger plant is projected at Louisville, employing many more hands than at Anderson. The abandoned buildings at Anderson will pass into the possession of another manufacturing concern, whose business will enable them to be utilized to their capacity.

Lake Iron Ore Matters.

DULUTH, November 25, 1899.—Most docks will have ceased shipments by the date of publication of this letter. They had last week brought down all ore for the season and since then have been cleaning up. Not since the ore industry became great at the western end of Lake Superior has there been such a November. Not a storm, not a day sufficiently cool to stiffen ore in cars or docks, not an unfavorable condition except rain, and with it all such a lack of demand for tonnage in other lines as has sent freights down instead of up, the universal trend at this season. This week rates have advanced to \$1.50 on the ore demand alone. Insurance companies are closing their year with the best accounts they have had for years. Companies like the Bessemer Steamship, the Minnesota Steamship and others who carry their own insurance have piled up a very neat surplus on the credit side of their insurance accounts.

The Minnesota Steamship Company will be in operation some time yet and the Duluth & Iron Range road purpose to send ore forward till January 1. The road's ore steaming apparatus has been put into shape and everything is in readiness for very late work. Never in prior years have shipments continued much beyond December 1 and the experiment of the Duluth & Iron Range road will have an important bearing on winter navigation on the Great Lakes in years to come. The company carry their own insurance and their ships are all of the staunchest description. By careful loading and not to quite the depth reached in summer and by cautious operation there should be no difficulty in continuing operations through any severe weather there is likely to be on the lakes at any season.

With Duluth receipts stopped, as they were Saturday, with Ashland through, with all other docks but those at Two Harbors on the final round up, it is easy to get a very close season's estimate. This is it:

Marquette range	Tons.
Menominee range	3,500,000
Gogebic range	3,000,000
	2,750,000
Michigan total	9,250,000
	Tons.
Duluth & Iron Range	4,200,000
Duluth, Missabe & Northern	3,300,000
Eastern Minnesota	890,000
Minnesota total	8,390,000

This makes a grand total for the year of 17,640,000 gross tons, providing the Duluth & Iron Range, now the only debatable factor, do what they expect. This is something like 3,000,000 tons above midsummer Cleveland estimates and 1,600,000 above those of *The Iron Age*. The continued mild weather and the Iron Range's bold operations are responsible for much of the increase. With rail shipments the total will be 18,000,000 tons.

On Mesaba range the Fayal mine has passed 1,000,000 tons and is still hustling. This enormous property has made a magnificent record this year. The Adams mine of the Consolidated Company has shipped over 700,000 tons; this in spite of the destruction of its chief shaft by fire. As I stated some months ago, the management have found most important extensions of the ore body and have now decided to open these with two shafts, Nos. 4 and 5, one to the north of the old body and one to the south. The mine will have five shipping shafts another year and may make a "seven figure" property, such as the Fayal is now. The company have a fine steel shaft house in place. The Vega mine, adjoining the Adams, has been leased by the Spruce Mining Company, which property also joins it, and will be opened at once, a machinery plant being on the way. The Spruce are sinking a large working shaft. A half interest in Roucheleau, an undeveloped but immense property in 17, 58—17, has been bought by the Oliver Mining Company, the other interest being in the hands of the Consolidated (Rockefeller) Company. The Sauntry mine of the Steel & Wire will make an output of 50,000 tons. This is a typical steam shovel mine and the dates of operations in development are interesting. Here they are: May 15, first shovel put into stripping; June 1, only 5000 yards moved; November 1, 225,000 yards moved and 4 miles of standard gauge track laid in the mine; November 18, first ore shipped, one shovel mining; November 24, 15,000 tons shipped; close of navigation, 50,000 tons shipped. That is a good deal like hustle. The Minnesota Iron Company have bought the mineral lands of the C. N. Nelson Lumber Company of the Mesaba range, having had them under option for a year. The price is about \$1,000,000 and the purchase includes the Auburn mine, which has been under a 25-cent lease to the Minnesota since its opening. There are some valuable lands in the deal, which the Minnesota Company have been examining with drills.

On the Menominee range the Pewabic has shipped 200,000 tons more than last year, a total of over 500,000 tons. It is through. The Oliver Company are beginning

work for the change in the course of Iron River that will aid in opening several of their new properties. A steam shovel is at work. The Minnesota Company are examining several new finds and are likely to close leases shortly. A. C. Ely has leased the McKenna property at Quinnesec at a royalty rate of 10 per cent. of the value of its ore at Ohio ports, a new kink in iron ore royalties.

The Duluth, Missabe & Northern road have contracted with the Pullman Palace Car Company for 500 ore cars to be delivered next year, of standard wood construction. Also for eight locomotives, one for hill work and the rest road engines, with the Pittsburgh Locomotive Works. This gives Minnesota ore roads this new equipment for 1900: Duluth & Iron Range, 350 56-ton steel cars, ten locomotives, equal to 700 old style cars; Eastern Minnesota, 400 50-ton steel cars and necessary engines, equal to 750 old style cars; Duluth, Missabe & Northern, 500 30-ton cars and eight locomotives.

D. E. W.

Discharging Men at the Navy Yards.

WASHINGTON, D. C., November 28, 1899.—The recent discharge of a large number of workmen at the Brooklyn Navy Yard has caused a great deal of speculation as to the policy of the Navy Department with regard to the work at the various yards throughout the country in view of the reported deficit in the appropriations, and many inquiries have reached the Department from manufacturers and other interested parties as to the extent to which normal operations will be interfered with by the financial shortage. The correspondent of *The Iron Age* has secured a statement from Chief Clerk Peters covering these points which will be read with interest by the general trade.

"The discharges made at the Brooklyn yard," said Mr. Peters, "were necessitated by the fact that our appropriation has run so low as to require careful husbanding to enable us to keep on with the more important work until Congress can have an opportunity to make up the deficiency. The situation is not serious, and we do not apprehend that any great hardships will be occasioned either the workmen, the contractors, or the Government. When the estimates for this year's appropriations were made it was thought they were generous enough to carry the Department well through the year. The remarkable activity of the past six months was underestimated, however, and nearly all the bureaus placed their figures too low. There was no disposition on the part of Congress to restrict the appropriations unreasonably, and if the estimates had been larger I have no doubt a more generous appropriation would have been made. We now find ourselves in a position where it is necessary to suspend such work as is not absolutely required at the earliest possible moment, and to devote our resources to meeting the actual needs of the service. For this reason we have made the reductions at the Brooklyn yard, and it is possible that other reductions may be made elsewhere. These are not likely to be important, however, and the Department does not doubt they will be only temporary."

"Congress meets in a week, and the Secretary will submit a statement of the exact situation, together with an estimate of the amount needed to carry us through to the end of the fiscal year. A special bill of the general type of an urgency deficiency measure will probably be drafted and put through at an early date. There is no question of policy involved in these expenditures, as they are purely routine, and there is every reason to believe that within a few weeks, if not a few days, we shall be running again under normal conditions in all the yards."

W. L. C.

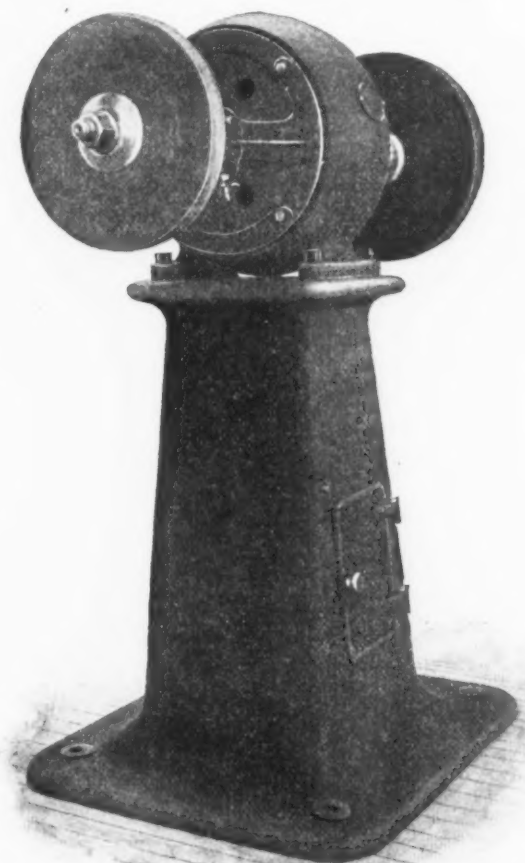
The Royal Steel & Iron Company.

A very curious document has reached us, entitled "Facts about Royal Steel and Iron." It appears that the Royal Steel & Iron Company of 160 Blackstone street, Boston, Mass., have a process—not described—which is to accomplish the usual marvels by means not stated. Testimony of "some of our best experts in this line on the strength of materials and Royal steel" is alluded to, but neither names nor matter is submitted. It seems that one foundryman made several runs in a crucible, using iron so poor and hard that another founder could not employ it. He got "the finest grade of cast iron I ever saw in all my 30 years as a foundryman." He adds: "I take great pride to myself for getting something out of nothing, as I consider the pig iron used of too poor a quality to be used under any conditions except yours."

The little pamphlet winds up with the words: "As iron and steel is the most permanent and promising investment now in the market, we offer a small block of this stock for extending our business." Capital, quantity offered and price not named. Avoid the rush.

The Northern Direct Connected Motor, Buffing Lathe and Emery Wheel.

The Northern Electrical Mfg. Company of Madison, Wis., have placed on the market an improvement in the method of operating buffing lathes and emery wheels. A completely inclosed electric motor is directly connected to the shaft on which the wheels are mounted. Those who have used the old style emery and buffing stands realize the difficulty of keeping the high speed belts and bearings in order as well as the liability of the bearings to heat, owing to the high tension necessary on the belts to prevent them from slipping, and in addition the nuisance of dirt and dust carried on the belt. These objections are all avoided by the use of the arrangement here illustrated. No belts are used, and the only strain on the bearings is that arising from the pressure applied in buffing or grinding by the workman. For this reason the life of the bearings is greatly lengthened and heating is entirely eliminated, all the bearings being self oiling. This system of construction also enables the machines to be placed so as to secure the best light, regardless of the



THE NORTHERN DIRECT CONNECTED MOTOR,
BUFFING LATHE AND EMERY WHEEL.

main shafting. The power is positive, the speed constant, and the work rapid and effective. When not in use no power is lost in needlessly driving countershafts. When in use the power used is only the minimum possible for the work performed. If economy of floor space is an item it can be entirely saved by obtaining the motor equipment without the stand and bolting it to the wall or a post. The motor can also be arranged for such speed variation as may be desired.

David Ross of Springfield, Ill., secretary of the Bureau of Labor Statistics of Illinois, has just published in the tenth biennial report the conclusions of a study of the results of private and municipal ownership in the operation of gas works, electric light and power plants and water works in the cities and towns of Illinois.

It is reported that the Pittsburgh Reduction Company of New Kensington, Pa., and Niagara Falls, N. Y., have decided to build a new aluminum plant in Canada, to be located at Shawenegen Falls on the St. Maurice River, at a cost of about \$1,000,000. A contract for 11 electric generators for the Canadian works is said to have been awarded to the Westinghouse Electric & Mfg. Company of Pittsburgh.

Proportions of Building Conspiracy.

Another phase of the labor troubles in the Chicago building trades has just been exposed by the George A. Fuller Company of that city, large building contractors, whose operations extend all over the country. On this subject a local journal makes the following comment:

A serious complication of the deplorable situation in the building industries is disclosed by the striking public sentiment of the George A. Fuller Company, which is corroborated by other responsible and well informed capitalists. The press has been vigorously assailing the affiliated unions of the Building Trades Council on the theory that the oppressive rules, extraordinary restrictions and outrageous interferences which have well nigh paralyzed Chicago building operations and driven enterprise out of the city have been the exclusive product of a labor conspiracy against builders, contractors and architects. In the absence of full and accurate knowledge this assumption was obviously justifiable, but the new revelations indicate that the blame does not lie at labor's door alone. The conspiracy is wider and deeper and more alarming.

According to the George A. Fuller Company "organized labor is by no means responsible for all of the present trouble." The origin of the existing demoralization and paralysis is due to the deliberate efforts of architects, subcontractors and material men to deprive certain general contractors of all business in the Chicago field. In the end their efforts have "taken the form of shameful combinations between subcontractors and local material men on the one hand and labor unions on the other." In other words, some of the rules to which the contractors now take exception were originally made at their own instance and solicitation. It is undoubtedly true that the unions have taken advantage of the situation, and have used scorpions where their fellow conspirators had intended only whips, but this abuse of their power by the labor leaders might have been foreseen.

Until recently material could be bought in any part of the United States and brought to Chicago. This did not suit the local material men, and they concluded that they could shut out all outside material by forming a combination with the unions. They offered labor not only higher wages, but the fullest license to adopt any rules they might see fit, pledging acquiescence in advance. They encouraged labor to call strikes, sympathetic and other, to boycott contractors who continued to purchase materials in outside markets. It was a selfish, sordid, suicidal policy, and we now behold its fruits. It does not lie in the mouth of the conspiring material men and contractors to attack the unions for the outrages they have themselves instigated. They are equally guilty, equally responsible.

This, however, does not exonerate the unions. Their limitation of the amount of work to be done, the intolerable dictation and corruption of the walking delegates, the prohibition of apprentices and other practices are their own precious contribution to the criminal conspiracy against the prosperity of Chicago, and these must be fought aggressively and resolutely. But the condition which afforded labor the opportunity of imposing its tyranny must also be mercilessly attacked and destroyed.

Every local interest is concerned in this fight. This is shown by the fact that Chicago has spent only \$7,000,000 in the last ten months on buildings, against over \$100,000,000 expended by New York. Everywhere there is healthy, unprecedented activity in the building trade, and Chicago alone has suffered decline and is now threatened with absolute stagnation. The sole cause lies in the vicious and unwarrantable combination between the selfish material men and contractors and the short sighted and reckless unionists. The welfare of capital and labor alike demands the uprooting of this extraordinary conspiracy.

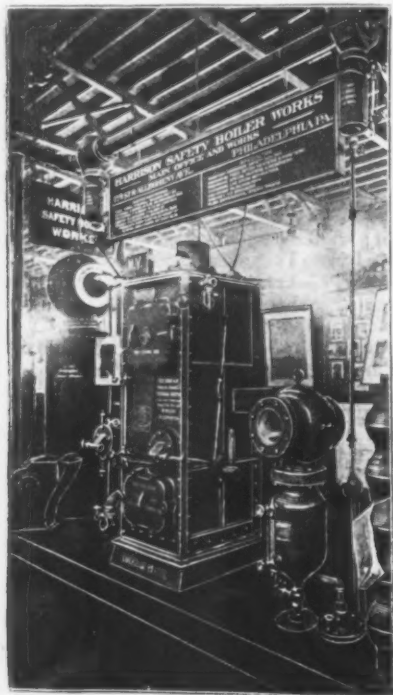
Central Metal & Supply Company, Baltimore, Md., who began business September 1 last, advise us that they are doing an encouraging amount of business and feel much gratified at the cordial reception tendered them by the trade. The company's business includes metals and plumbers', steam fitters' and cannery supplies. They occupy a commodious warehouse at 606 E. Lombard street. The company have been incorporated with the following officers: August Wehr, president; Dr. G. W. Lehmann, vice-president; William Schlupp, Jr., secretary-treasurer, and William L. Wontiseth, general manager. Two of the gentlemen interested in the company were formerly connected with Clendenin Bros. of Baltimore.

The Cuban-American Mining Company of New York City have been incorporated under West Virginia laws with a capital of \$1,000,000 to do a general mining business. G. A. Meyer, C. E. Levy and J. H. Crossman of New York City, T. A. Bates of Cleveland and J. C. Richard of Cincinnati, Ohio, are the incorporators.

Exhibits at the National Export Exposition.

The Harrison Safety Boiler Works.

The Harrison Safety Boiler Works of Philadelphia have an interesting exhibit of their specialties. For the proper display of the productions shown a line of steam pipe has been rigged in the form of a square arch. At the right of the exhibit is a section of a Harrison safety boiler, from which the steam pipe leads. At either end



THE HARRISON SAFETY BOILER WORKS.

of the top section of the piping is a Cochrane separator. At the left side of the arch or piping is another Cochrane separator of large size and a very small one for use vertically. In the center of the space and toward the front is a Cochrane feed water heater and purifier. On this heater is a notice to the effect that a working exhibit of the Cochrane heater may be seen in the pump room of the power house heating all the feed water used in the boilers of the exposition. At the rear of the exhibit are several frames containing photographs and blue prints of the heaters and separators. There are also on exhibition some of the Creasy ice breakers made by the concern.

The Fairbanks Company.

The Fairbanks Company of New York have a very large exhibit covering most of the specialties handled by them. There is a neat railing around the exhibit with an ornamental arcade front of plaster work surmounted by a figure representing their general trade-mark. Lathes, shapers and other machine tools are shown, among them the Victoria automatic gear cutter made by Gould & Eberhardt, Newark, N. J. The Oster stocks and dies and Oster machinists' and blacksmiths' screw plates are prominent in the exhibit, and there are several groups of valve fittings and tools of all kinds. Quite an amount of space is given over to the scales made by the company, of which a large variety are seen.

Frank Toomey.

A good exhibit of Reilly steam pumps in different sizes and styles is made by Frank Toomey of Philadelphia. One of the pumps is shown in service and the efficiency of its discharge thus demonstrated.

The Geo. V. Cresson Company.

A large space near the entrance to the power house from the main exhibition hall is occupied by the G. V. Cresson Company of Philadelphia. They show the Buchanan rock and ore breaker, Buchanan magnetic separator and Buchanan crushing rolls, all made by them and representing a type of mining and manufacturing machinery largely used both at home and abroad. Near the entrance to the exhibit is a rack of steel shafting of different sizes turned and finished by the company's patented process. On a table, conspicuous among other fittings, is a Para pneumatic pulley, claimed to prevent absolutely the slipping of belts and to effectually forestall the incessant waste of power encountered in many kinds

of mechanical plants. Pulleys of all descriptions are shown, also other fittings entering into power transmission equipment, including the company's patent improved ball and socket adjustable parting hanger with bearings ring oiling and babbitted, and their patent internal clamp coupling, made from one casting, combining the inner clamps with the outer casing and having inserted between them fine thread taper screws bearing the whole length. The principal claim made for this coupling is that the clamps being divided across the center of the coupling they are thus independent of each other and are enabled to grasp firmly the end of each shaft. Gear wheels of different kinds are shown, including a large double helical gearing over 8 feet in diameter. A large rope wheel is also shown. A line of Pelton water wheels embracing six sizes is given prominence at the main front of the exhibit. The display is well arranged and is surrounded by a substantial railing of oak.

The Link-Belt Engineering Company.

Philadelphia, have a neat and well planned exhibit covering some of their productions. They have depended largely upon photographs to demonstrate the practicability of their different styles of conveying machinery and quite a number of photographs are shown arranged in rows. Different types of conveying apparatus are shown by simple sections. These sections include two styles of coal handling and conveying machines, a link-belt carrier, a continuous bucket elevator, barrel and hay elevators, bale or package elevators and racks showing the different styles of conveying belts. The exhibit is inclosed within a brass railing.

The American Pulley Company.

The American Pulley Company of Philadelphia have an interesting exhibit located at the main entrance to the power house. The exhibit is composed entirely of their all wrought steel split pulleys, the pulleys which won the gold medal of the Franklin Institute. At the front of the exhibit and towering above the adjacent exhibits is a column of pulleys of different sizes tapering from a 24 x 12 inch pulley to one 6 x 6 inches. A similar column is seen at the other end. A 24 x 8 inch pulley and a 20 x 3 inch pulley are shown under power and running 1500 revolutions. A cone of 4-inch face pulleys are also shown under power. The power is provided by a C & C electric motor. Tight and loose patterns of the pulleys are shown and easily examined. On a table is displayed all the stamped parts which enter into the construction of the pulleys, the display demonstrating to a large extent the possibilities of stamped steel. A good many of the company's pulleys are on view as forming part of the power equipment in the exposition buildings.

The Phoenix Bridge Company.

Our engraving shows the arrangement of the exhibit of the Phoenix Bridge Company in conjunction with the



THE PHOENIX BRIDGE COMPANY.

display of the Phoenix Iron Company as described in *The Iron Age* issue of October 26.

Alan Wood Company.

The exhibit of Alan Wood Company, Philadelphia, is one of the most representative exhibits to be seen in any of the buildings in that it is made up almost entirely of the products of the company's mills. Sheet iron and steel and light plates being practically their whole line it is evident that some thought was required to make an exhibit which would be anything more than a very ordinary display of goods. That the company have made a splendid showing the engraving here presented fully proves. The architectural front is made entirely of their patent planished iron and is seen to be very massive in design. The pedestal in the center is also of planished

iron and is used to carry a group of figures, gilded, representing the trade-mark adopted to cover the planished iron, an eagle conquering a bear, symbolical of the triumph of planished iron made in America over the once popular Russia iron. The range boiler is shown as demonstrating the use of their special bath boiler iron. The



ALAN WOOD COMPANY.

cylinders or pipes seen just within the entrance are made of the special water pipe iron made by the concern, and there is a cement lined tube of large diameter on the floor made of the same iron. On easels in the rear of the exhibit are some smooth rolled black sheets in ordinary stock sizes, also black and galvanized flat and corrugated sheets. The large sign is painted on a plate of blue annealed steel $\frac{1}{8}$ inch thick, 60 x 96 inches. The stand and card table seen in the arches are made of stamped sheet iron and are beautiful specimens of work.

The American Tin Plate Company,

Chicago, Ill., have a very attractive exhibit, covering a line of tin plates made at their different plants. The back of the exhibit is formed by a paneled screen, on which is displayed a number of photographic views of several of the plants, the lower part of the screen supporting a line of tin plates removed from their packing boxes. Above the screen and running its whole length is the



THE AMERICAN TIN PLATE COMPANY.

company's sign, surmounted by a gilt eagle and national flags. There is a neat tubular railing in front of the exhibit made from the black plates used for tinning stock. The center of the railing is in the form of an arch and covers the entrance to the exhibit. Within the arch is suspended a large tin plate bearing the company's name. Inside the inclosure are boxes of tin plates from various mills, the upper boxes having the covers removed. The materials from which tin and terne plates are made are shown and comprise pig lead, block tin, steel bar and sheets as they come from the first, second and third rollings. Black plates are also shown, hot rolled, pickled and annealed and cold rolled. The exhibit has attracted considerable attention.

Bringing the Foundrymen's Associations in Closer Connection.

A meeting of representatives of various foundrymen's associations was held at the Manufacturers' Club, Philadelphia, on the 16th inst. The associations represented were the Philadelphia Foundrymen's Association, Pittsburgh Foundrymen's Association, the American Foundrymen's Association and the Western Foundrymen's Association of Chicago. The Philadelphia Association was represented by T. I. Rankin, Howard Evans, A. C. Pessano, Wm. Hanson, E. E. Brown and J. S. Sterling; the Pittsburgh Association by J. S. McDonald, the American Association by J. S. Seaman and the Western Association by John A. Penton. They organized by electing T. I. Rankin chairman and John A. Penton as secretary.

The meeting had been called for the purpose of devising some means to secure a closer relation among the different associations, for the purpose of promoting greater unity and accomplishing substantial benefit to the foundry trade in securing papers referring to foundry topics and in other ways facilitating the work of the various local associations.

The experience of the different associations has shown that it is sometimes difficult to secure papers for one association while others were able to obtain them with comparative ease. Valuable papers read before one of the associations have proved to be hardly appropriate for a meeting held a considerable time afterward by another association. It is often quite desirable that such subjects, however, should be discussed by foundrymen in various parts of the country who would develop valuable ideas. It was therefore pointed out by some of those present that more could be accomplished by having the several local associations hold meetings on the same evening in all parts of the country, and then have the discussions of all the meetings printed in the journal of the American Foundrymen's Association and in the different trade papers. The matter was thoroughly discussed and a motion was then adopted that a committee of two should be appointed to draw up resolutions covering the points which had been brought out. The chairman appointed J. A. Sterling and John A. Penton, who retired and subsequently presented the following report, which they recommended to the meeting for adoption:

"Whereas, There are in this country a number of local foundrymen and a national organization known as the American Foundrymen's Association, all organized for similar purposes—viz., the bringing together more closely of those engaged in the foundry business, encouraging by every means possible the preparation of technical and practical papers treating of foundry subjects, the disseminating of foundry knowledge and the holding of regular meetings at stated periods when the welfare of the members may be promoted by every possible means; and,

"Whereas, There would seem to be lacking a unity of action in the work of these associations in the carrying out of the purposes for which they were instituted, while it is apparent that a closer affiliation between the several local associations and the American Foundrymen's Association could only work advantageously to all concerned; therefore, be it

"Resolved, That it is the sense of this meeting that steps should be immediately taken by the various organizations referred to that will tend toward the facilitating of united action on the part of the different associations by the adoption of the following suggestions:

"1. The holding of the meetings of all the different local associations on the same night.

"2. The preparation and publication in advance and the distribution of the papers to be read at the different meetings of the affiliated local associations, same to be read on the same evening.

"3. The publication of said papers in full in the journal of the American Foundrymen's Association, as well as the discussions arising at the meetings at which said papers are read.

"4. That a committee consisting of the secretaries of the different associations have charge of the securing, preparing and publishing and distributing of said papers.

"5. That it is the sense of those present at this conference that if these suggestions are favorably acted upon by the different organizations the plan suggested should go into operation on January 1, 1900."

The resolutions were adopted unanimously after full discussion and Secretary Penton was instructed to advise the secretaries of the different associations of the action taken.

The committee representing the Association of Iron and Steel Sheet Manufacturers and the Amalgamated Association of Iron, Steel and Tin Workers met in Pittsburgh last week for the purpose of fixing a wage scale for sheet mills for November and December. It was found the average price of sheets shipped by the mills during September and October did not warrant an advance in present wages.

THE WEEK.

At her preliminary trial last week the British turbine torpedo boat "Viper" developed a speed of 32 knots an hour.

Against tide, wind and a heavy head sea for half her course the new United States battle ship "Kentucky" made a record of 16.877 knots an hour on her official speed trial over the Government course off Boston, Mass., on Friday last. The trial proved the "Kentucky" to be a little faster than her sister vessel, the "Kearsarge," also built by the Newport News Shipbuilding & Dry Dock Company and which also went over the same course at her recent trial. The maximum speed accomplished by the "Kentucky" was 17.254 knots an hour with wind and tide in her favor.

The Attorney-General of the State of Nebraska has begun a suit before the Nebraska Supreme Court with the avowed purpose of driving the Standard Oil Company out of the State for alleged violation of the statutes regulating combinations and trusts.

In his forthcoming annual report the Secretary of the Navy will strongly urge that authority be given for the construction of additional dry docks. He will ask for one more dock at the Brooklyn Navy Yard and one dock at Norfolk, Va. Secretary Long will ask that the docks be constructed of stone and to cost about \$1,000,000 each.

The fact that Li Hung Chang has been appointed Minister of Commerce by the Chinese Government is regarded as tending to improve greatly foreign commercial relations with China.

A meeting of representatives of all the leading concerns in the electrical fan manufacturing business was held last week in New York City, at which it was decided to form a permanent organization under the title of the American Association of Electrical Fan Manufacturers. The object of the association is to secure better, more stable and so far as possible uniform prices. The industry in this country is in the hands of about 14 firms and the capital employed is more than \$25,000,000.

The successful demonstrations made by the Holland submarine torpedo boat a few weeks ago seem to have created a very favorable impression upon the naval representatives of more than one foreign country. Captain Ottley, the British naval attaché at Washington, has recommended to his Government the adoption of vessels of the Holland type for use in the British navy.

Twenty insurance companies that pleaded guilty in the Supreme Court of Missouri to having violated the State anti-trust law have been fined \$1000 each and costs.

A planter at St. Thomas' Parish, near Charleston, S. C., has achieved a very notable success in silk culture. His annual income from this source is said to amount to from \$6000 to \$8000.

The St. Petersburg correspondent of the *London Daily Mail* says that the Russian and Persian Governments have signed an agreement prolonging for ten years Russia's railway construction monopoly in Persia.

The contracts for the six new 3500-ton steel cruisers for the United States navy were awarded on Monday, in accordance with the recommendation of the Board of Naval Construction. One vessel each was awarded to the following concerns: Wm. R. Trigg & Co., Richmond, Va.; Lewis Nixon, Elizabethport, N. J.; Bath Iron Works, Bath, Maine; Fall River Engine Company, Fall River, Mass.; Nefie & Levy of Philadelphia and the Union Iron Works, San Francisco.

It is stated that Secretary Root in his annual report will recommend that Cuba be divided for purposes of administration into two departments, eastern and western.

The Pittsburgh Foundry Strike.—The troubles which have existed for some time between the core makers employed in the foundries in Pittsburgh and Allegheny and immediate vicinity and their employees were settled last week. An agreement has been made and signed by both sides. It is as follows: "This agreement, made this 24th day of November, 1899, between a committee of the contractors of Pittsburgh, Allegheny and vicinity and the founders represented by their committee, all as undersigned, is to be for one year from October 31, 1899. Should any difference occur it is to be settled on the lines of the New York agreement between the I. M. U. of N. A. and National Founders' Association. The wages of journeymen core makers now employed or hereafter employed to be \$2.75 per day. The present shop conditions are not to be disturbed; but hereafter when engaging additional help none but journeymen or apprentices are to be employed. The foreman of the shop to be

the judge who is entitled to journeymen's wages. Time and half time is to be paid for overtime and double time for Sunday, Christmas, Decoration Day, Fourth of July and Thanksgiving Day. Coremakers—M. J. McNamara, John Quinn, R. N. Manis. Foundrymen—Isaac W. Frank, J. H. Noble."

Central Pennsylvania News.

HARRISBURG, November 27, 1899.—It is not so much a shortage of iron in this territory as it is a shortage of coal and coke. During the last ten days several of the more important departments of the Pennsylvania Steel Works, the Central Iron & Steel Works, the Chesapeake Nail Works and other plants have been compelled to suspend operations repeatedly on account of the lack of fuel. But this trouble is gradually being overcome and it is expected that the fuel question will not embarrass the iron and steel manufacturers here so much during the rest of the winter.

There has been a distinct falling off in the number of inquiries as well as in the orders recently and the manufacturers have come to the conclusion that the consumers of steel products are taking a breathing spell and sizing up the situation. One prominent steel man gave it as his opinion that the users of structural steel were going slow, especially in the erection of large buildings, in the hope that there might be a drop in the price next year. He further expressed the belief that these same consumers would probably realize before the first month of the new year has ended that the prices are more likely to go higher and would then place their orders without delay. The slight slump in orders is a relief to some of the manufacturers who have been running their plants day and night for months without the usual time for repairs and stock taking. They will be satisfied to have a short lull in which to prepare for the next race of supply against demand.

Prices are advancing on the finished product as well as the raw materials. Four times this year the Harrisburg Foundry & Machine Works have been compelled to advance their prices. The new and old plants of this company are both in steady operation and the orders already booked are sufficient to insure uninterrupted running until next August. This company are making large shipments to the West Indies and foreign ports. The home market, however, is so satisfactory just now that General Manager Fleming intimated that the foreign trade was not being sought as it might be later. It is his opinion that the present great demand for the products of iron and steel would continue until the plants have expanded sufficiently to produce the supply that is needed. The foundry and machine works are compelled to run their new plant in sections. There has been delay in getting tools and new machinery and it is operated as fast as installed. The first heat of the new foundry on Thursday was very satisfactory. It has two cupolas, one of 40 tons and the other of 60 tons capacity.

It is said that the Pennsylvania Railroad Company want to buy the Herr street mill of the Central Iron & Steel Company. The railroad company need the property for track purposes.

The Metallurgical Industries in 1898.—One of the most ambitious and complete annual reports in the commercial development of the iron and steel industry is that of the Association des Maitres de Forge de Charleroi, Belgium, which, we believe, is from the pen of H. de Nimal, the secretary. It is practically a review of the iron industry of the world, M. de Nimal drawing upon many official sources for his data. The report for 1898 has just been issued. In an introductory chapter he deals with the general financial, political and commercial considerations influencing the development of iron making in the world, and deals then with that of Europe, Asia, Africa, Australasia and America. Then follow two interesting chapters on the iron industry of Russia and of Sweden. The report on Belgium is naturally very full and exhaustive. There is a discussion of the statistics of production of pig iron, steel and coke, of the export trade and of the rates of freight by rail and by canal. The balance of the first section of the work is taken up with a review of the salient features of the iron trade in England, Germany and the United States. The second section is a presentation of the detailed statistics of Belgium, Germany, Great Britain, France and the United States. The report throughout shows painstaking care and an intelligent appreciation of the principal considerations affecting the shifting conditions of the industry in the different countries.

Plans have been about completed for the construction of a blast furnace in Ellwood City, Pa. It will be located on a farm bordering the city and containing 66 acres. The plant will be owned and operated by Youngstown capitalists.

The Iron Age

New York, Thursday, November 30, 1899.

DAVID WILLIAMS COMPANY,	- - - - -	PUBLISHERS.
CHARLES KIRCHHOFF,	- - - - -	EDITOR.
GEO. W. COPE,	- - - - -	ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS,	- - - - -	MANUFACTURING EDITOR.
JOHN S. KING,	- - - - -	BUSINESS MANAGER.

The Chicago Building Trade Imbroglio.

The labor situation in Chicago has not improved. The labor leaders have rejected the ultimatum laid down by the contractors, as might have been expected. A long and bitter contest, therefore, seems inevitable, beginning with the new year, unless conciliation should be effected through the interposition of other interests, which would suffer most seriously if all building operations in the city were suspended indefinitely. The danger of such a suspension is regarded as so imminent that contractors are crowding the work of finishing buildings now under construction, so that they will not be caught by orders to stop work after December 31.

A new element of trouble was disclosed last week, which had been partly suspected but of which proof had not developed. The fact was made public that certain Chicago manufacturers of materials used largely in building had made combinations with subcontractors and labor unions through which the use of local material was forced upon owners of buildings, whether of inferior quality or higher priced than could be procured from outside manufacturers. Combinations of this character had greatly strengthened the unions and considerably magnified the self importance of labor leaders. They were not found only among brick and tile manufacturers, but in quarters which would not have been suspected. This, of course, has operated to the disadvantage of such manufacturers in endeavoring to compete for business in other cities, for their cost of production has been heavily increased by the high wages they are compelled to pay their workmen who form part of the Chicago building trades labor organization. Nevertheless, they must have found some advantage in the arrangement or they would not have made it.

While the situation has thus been somewhat complicated, it is asserted that the main question will not be permitted to become obscured. Another requirement has simply been added to the list which contractors assert they propose to insist upon acceptance by labor leaders, and that is that all restrictions on manufactured material must be absolutely wiped out.

Government Directors on Trust Boards.

A novel proposition comes from the West relative to governmental supervision of the so-called "trusts." Congressman Lorimer of the Subcommittee on Transportation of the Congressional Industrial Commission made the public statement while in Chicago that "trade combinations—trusts—are ready for and invite governmental supervision." He went still further and said that the officers of one great corporation had told him that no objection would be raised to the Government having a representative on their Board of Directors. He named as his authority, President John Lambert and Chairman John W. Gates of the American Steel & Wire Company. The examination of their books by the Government inspectors would meet with no opposition, Mr. Lambert said, if reports were not published in such a way as

might benefit competitors. He believed that officials of trade combinations generally held this position, having, of course, a selfish purpose in the desire to make their stock more secure.

The question of governmental supervision of these great industrial corporations is one which has frequently been discussed from an early period in the consolidation movement. The necessity was perceived of some action which would at least attempt to insure the protection of the interests of stockholders. It was believed that opportunities were being created which might be used by unscrupulous individuals to enrich themselves at the expense of those who had their money invested, but had no voice in the management of affairs. In all the discussion, however, the suggestion does not appear to have been made until now that the Government should have a representative in the directory of each of these great concerns. Such an arrangement would, of course, bring the Government into much more intimate relations with the "trusts" than the appointment of mere inspectors or examiners of accounts, especially if the Government directors were all and singly selected for their probity, ability and expert knowledge of the particular business to which they should be assigned.

The proposition is exceedingly clever, and is characteristic of the minds with which it originated. It is well calculated to placate the opposition to "trusts" and to present them in a different light to the people at large. In welcoming a Government official as part of their directory they show that the "trust" does not defy popular opinion as to its methods and does not fear publicity as to its management. But the adoption by Congress of such a plan of supervision would seem to be very remote. Even if all the consolidations favor it, which is out of the question, the active antagonists of "trusts" would never consent to such official recognition of their right to exist, because their aim is the total destruction of the modern consolidation.

The Collapse in Spelter.

The interposition of the authority of the State of Missouri seems not to have been necessary in breaking the power of the combination among the zinc ore miners, to which attention was recently called in these columns. The high price which zinc ore had attained proved to be as efficacious in upsetting the plans of the miners' organization as any legal remedy could possibly accomplish. Too many persons became interested in prospecting for ore, and the market was supplied through their efforts to such an extent that it was impossible to maintain the price at the figure which had been fixed. Ore has consequently fallen in value with great rapidity and the price of spelter is consequently down to a reasonable level. The reduction made in spelter has been so great that it is possible that the metal will soon again be able to find its way into foreign markets from American smelting works. The reduction in the price of spelter, however, is not so important from the standpoint of the export trade as from the view of American consumers. It enters into so many branches of manufacture, and is such an important adjunct to the iron, steel and metal trades, that its fall to the price now prevailing will be appreciated by a large circle of consumers. Considering this question broadly, it is, of course, desirable for the general good that everybody connected with the production of the ore and its conversion into merchantable product shall receive fair remuneration for their investment of capital and for their labor, but the price of spelter had been forced to such an extravagant height that the collapse which has now come is regarded with consider-

able satisfaction. The course of this trade is a warning, if it will be heeded, of what must happen in other lines when prices are unreasonably advanced.

The Industrial Commission.

WASHINGTON, D. C., November 28, 1899.—The material which the Federal Industrial Commission has gathered concerning great aggregations of capital into combinations, or so called trusts, is now being prepared by Professor Jenks for transmission to Congress with a preliminary report in which will be foreshadowed the conclusions of the Commission as to the advisability of the enactment of legislation, either Federal or State, to meet the conditions which have been found to exist. It is the present intention of the Commission to present this report to Congress immediately upon the reconvening of both houses after the holiday recess.

As the Commission, aside from its inquiry into the methods of the Standard Oil Company, has devoted itself almost exclusively to the investigation of combinations in the iron and steel trade, therefore the forthcoming report will be of unusual interest to those engaged in this great industry. The investigation has been as comprehensive as the Commission has been able to make it, though the fact has been commented upon that the larger proportion of witnesses examined have been those identified with the combinations and have naturally sought to put the best possible face upon the matter. These criticisms have not disturbed the members of the Commission, as experience has taught them that little valuable evidence is to be had concerning these combinations from so called independent producers or from others who are not immediately identified with them. In this connection the Commission had a most disagreeable experience in the early part of the investigation into the methods of the Standard Oil Company. The first witnesses examined were volunteers who presented themselves for the purpose of testifying to irregularities and oppressive tactics alleged to have been employed by the company in their dealings with their employees and the public. Testimony of this character occupied the Commission for several days, but subsequently official records were presented by officers of the company showing these witnesses to have been disgruntled discharged employees, and in one case a witness was shown to have been under indictment for embezzlement from the company at the time of giving his testimony. Since the occurrence of this incident the Commission has used great care in the selection of witnesses and has fought shy of volunteers.

In dealing with the subject of combinations in the iron and steel trade in the report about to be made to Congress the Commission will confine itself almost exclusively to the evidence presented by the officers of these great corporations themselves. Those who expect that the Commission will attack the combinations sharply will be greatly disappointed. It is probable that no Congressional commission appointed to investigate a subject has received so much light in so short a space of time and experienced so radical a change in its convictions. At the outset the members were almost unanimously opposed to combinations of capital of any kind, and the opinion was generally entertained that while varying somewhat in form the aims and objects of all corporations were the same, and that the chief reason for their creation was the desire on the part of the managers of the constituent companies to raise the price of the commodity in the manufacture of which they were engaged. The impression was also strong that a considerable proportion of the profit which these large combinations were able to make was derived from the reduction not only in the number of employees, but in their rate of compensation, and the so called "hostility of labor to the trusts" was regarded by members of the Commission as evidence of the extent to which the big combinations took advantage of the difficulty experienced by their employees in finding lucrative employment elsewhere in the event of disagreements. The extent to which these opinions have been modified may be partially gathered from the following statement made to the correspondent of *The Iron Age* by a member of the Commission.

"So far as the iron and steel trade is concerned, we have found an entirely different situation than we had believed to exist. In the first place we find that there are two distinct classes of these industrial combinations. The first of these is composed of constituent companies which can be said never to have been active competitors prior to their consolidation. Such a corporation, for example, is the Federal Steel Company. According to the evidence submitted to us this company are the owners of large iron mines, at least one large steamship company, a railroad and two or three manufacturing plants. Prior

to their absorption these mines, the railroad and the steamship company certainly could not be said to be competitors, and the two or three manufacturing plants in the combination turned out different classes of material, as we are informed. Such a combination had a reason for their existence which appeals to any sane mind. They would appear to have been organized for the purpose of procuring their necessary raw material at the lowest price for transporting that material to their plants without paying a profit to a transportation company, for handling it by rail at a minimum of cost, and, finally, to supply their customers with exactly the product they desired at a price that would enable the company to withstand the competition of their most active rivals. It is difficult to see how such a corporation can be criticised providing they are not overcapitalized and that they do not violate the spirit or the letter of the laws under which they are chartered.

"A type of the other corporations referred to is found in such a combination as the American Tin Plate Company. We have had more evidence concerning this corporation than any other to which we have given our attention, and there seems to be no question that they were organized for the purpose of shutting off practically all competition by bringing a large number of competing concerns into the same syndicate, closing down such plants as cannot be run at the minimum of expense and increasing the output of mills most favorably located. While I do not speak for the Commission, it seems to me that there is a wide variance between the methods of these two classes of corporations, but whether either of them requires regulation by Congress or State Legislature is an open question. It would seem that as to the first class I have referred to all features of the so called trust are absent, but we are equally satisfied that they are present in the corporations of the second class. Whether recommending legislation or not the Commission will certainly discriminate in its report between these two kinds of corporations. So far as we have gone there is little or no evidence in the iron and steel testimony that any attempt has been made to raise prices as the result of combinations. Prices have gone up, it is true, but the evidence is overwhelming that the cost of raw materials has risen much more rapidly and in a much greater proportion than the prices of the finished product."

The trade will await with much interest the Commission's report on the industrial combinations even though there is little reason to believe that any legislation will be based thereon at least during the present Congress.

W. L. C.

Freights on Ore, Coal and Coke.—The general freight agents of the Pennsylvania lines west of Pittsburgh—Pennsylvania Railroad, Pittsburgh & Lake Erie and Baltimore & Ohio Railroads—met in Pittsburgh on Monday, November 27, to discuss a proposition to advance rates on coal, iron ore, coke and limestone for next season. No definite action was taken. It is generally understood that the railroads would like to see an advance in rates on iron ore, but the Pittsburgh, Bessemer & Lake Erie Railroad, which is a Carnegie road, stands in the way. The net rate for ore established when the Carnegie road was built from Conneaut Harbor to Bessemer, was 78 cents a ton, less 25 cents a ton which goes to the Union Railroad, owned by the Carnegie interests. The old rate had been \$1.15 a ton, including 20 cents a ton for dockage, but the rate fixed by the Bessemer Road also went into effect on the other roads. The Carnegie railroad has never joined the Freight Association, has never been represented at any of its meetings and it would be very difficult to secure an advance on iron ore rates unless the Pittsburgh, Bessemer & Lake Erie agrees to it.

So great is the tonnage in iron ore, coal and coke being moved over the Pittsburgh & Lake Erie Railroad for several weeks that that road has been compelled to borrow eight of the most powerful locomotives owned by the Lake Shore & Michigan Southern Railroad. In order to provide against any lack of power next season the Pittsburgh & Lake Erie Railroad has given a contract to the Pittsburgh Locomotive Works, Allegheny, Pa., for 15 consolidated locomotives. These will be ready for use on the road by the opening of navigation next season.

The Board of Arbitration appointed to settle the difficulties between the molders and the foundries in the Pittsburgh district has been unsuccessful, but the men are still at work. It is likely, however, the men will go out on strike again this week, unless the original demand for a minimum rate of \$3 a day is granted. This demand is to be made upon the foundries in the Pittsburgh district this week, and unless it is granted, which does not seem likely, it is probable a strike will take place.

PERSONAL.

Charles M. Rolker, the well-known American mining engineer, has resumed the practice of his profession, with headquarters at the Leadenhall buildings, Leadenhall street, London, E. C.

Philip Jones, recently of Lisbon, Ohio, has succeeded Herman Joseph as superintendent of the Republic Iron & Steel Company's rolling mill at New Albany, Ind.

Chas. A. Otis, Jr., of Cleveland, Ohio, has become a member of the New York Stock Exchange.

S. P. Sheldon, superintendent of the open hearth department of the Otis Steel Company, Cleveland, Ohio, will shortly assume the position of assistant general superintendent of the Joliet works of the Illinois Steel Company.

Frank H. Miller of Miller, Wagoner, Feiser & Co., has been selected as general manager of the new blast furnace plant to be built at Columbus, Ohio.

L. R. Pomeroy, who has for a number of years represented the Cambria Steel Company in New York for certain departments, has resigned to accept a position with the Schenectady Locomotive Works.

Harry J. Lawrence, formerly of Johnson Coal Mining Company at Pittsburgh, has been appointed traffic manager for the Pittsburgh Coal Company, the appointment taking effect at once.

R. P. Douglas, formerly manager of the Eliza blast furnace of Laughlin & Co. at Pittsburgh, has again taken charge of the plant.

E. J. Barney has resigned his position as president of the Barney & Smith Car Company, at Dayton, Pa. A special meeting of the directors will be held the first of the year to appoint his successor.

H. Bulwer Fagnani of the London office of the American Steel & Wire Company, is at present in the United States visiting the various plants of the company. Mr. Fagnani has just started on a trip through the West and expects to return to England on the "Lucania," sailing December 16.

Francis Fenwick of Fenwick Frères & Co., Paris, is now in this country. He may be reached by addressing letters to him at 50 West Twenty-eighth street, New York City.

John C. Trautwine has resigned his office as Chief of the Philadelphia Water Bureau.

Henry C. Frick has made a gift of \$25,000 to Wooster University, Wooster, Ohio, for a new library building. The gift was announced on November 3, in connection with the inauguration of the new president of the university. Mr. Frick spent a part of his boyhood in Wooster and his mother lives there now.

Captain Zalinski, of dynamite cruiser fame, delivered a lecture on Japanese swords before the Engineers' Club of New York, on Tuesday evening. Afterward L. C. Grover, superintendent of the Colt plant, at Hartford, Conn., showed a new automatic revolver.

James C. Corns has resigned his position as third vice-president of the Republic Iron & Steel Company, in order to give his undivided attention to his duties as district manager of the Northern Ohio district.

Employees as Stockholders.

The policy of encouraging employees to invest their savings in the stock of the company that employs them has worked out excellently in the experience of two of the leading railroad corporations of this country. The plan was inaugurated some years ago by President Depew of the New York Central and more recently by President Fish of the Illinois Central, and it has proved both popular and successful. It is believed that the financial interest thus secured by the men is the best guarantee against strikes, while the sense of ownership involved in the holding of stock tends to make the employees more faithful and efficient in their work. Moreover, it provides them with a safe and profitable investment for their savings. In the experience of the New York Central, the fact that so many of their men have a direct pecuniary interest in the company, nearly one-third of the company's force holding shares in the property, has been the means of averting more than one threatened strike and of breaking down the only serious strike that has occurred on that road in many years. The Illinois Central Railroad Company now have over seven hundred employee stockholders on their books, with holdings amounting to more than twenty-five hun-

dred shares, and worth nearly \$300,000. They sell the stock to their employees on the installment plan, payment being accepted in sums of five dollars or any multiple thereof, and interest at four per cent. is allowed on the partial payments. Under these conditions the company's paymaster is authorized to sell, on the first of each month, one share to each employee at the market price ruling that day on the New York Stock Exchange. It is found that this plan works for the benefit of both the employers and the employed, and it is likely that other large corporations will follow the lead of the two great transportation companies in this matter. Anything that secures a community of interests between capital and labor promotes the well being of both, and is a step in the right direction which must be welcomed as a sound economical proposition.

The Republic Iron & Steel Company.

At a meeting of the directors of the Republic Iron & Steel Company, held at their New York offices, 66 Broadway, a dividend of 1½ per cent. was declared on the preferred stock of the company. James C. Corns resigned as third vice-president of the company and is succeeded by Alex. W. Thompson of New Castle. Mr. Corns is district manager of the Northern district, and owing to his duties in this capacity found it impossible to perform the duties of vice-president at Chicago.

President R. S. Warner made the following statement and authorized its publication in *The Iron Age*:

We have contracted for our raw material for our blast furnaces, such as coke, limestone, &c., to January 1, 1901, our supply for our furnaces being covered from our own mills to July 1, 1900. Our monthly sales are keeping pace with our production, and the outlook is most encouraging. The physical condition of our mills has been greatly improved since they were turned over to us on May 1, and extraordinary repairs have been made at quite a number of our larger plants. All of these repairs have been charged to operating expenses. As many of these repairs will last for some years, we could properly have distributed these charges through a period of months. It is not, however, the policy of our company to do this. We consider it wiser to have all expenses for repairs charged from time to time as they are made to operating expenses, as we will get the full benefit in results later on. I am pleased to report satisfactory progress on the Bessemer steel plant at our Brown-Bonnell Works, at Youngstown, Ohio. Most of the foundations are completed and the balance well under way. We are installing in this plant a great deal of labor saving machinery, and unless we have unusual delays we hope to be making steel there some time in March. We are building an additional 25-ton open hearth furnace to our open hearth plant at Minneapolis. This will increase our output of open hearth steel at this plant very materially. We expect to have this ready for operation by February 1. On our Pioneer property at Thomas, Ala., we commenced mining coal from our Sayreton mine (which is the New Castle vein of coal) in September. We are also opening up the Pratt vein of coal and hope to be able to ship coal from this mine within 90 days.

We are going to build two additional blast furnaces on this property. On account of the inability to get blowing engines for anything like nearby delivery, we can hardly expect to have the first furnace in operation before some time next fall. We are also opening up additional ore mines on this property. This property has been carefully examined by several of our Executive Committee and all of our reports from them are very enthusiastic. The property when fully developed will have great earning capacity, having abundant ore, coking coal and limestone to supply four furnaces for many years. Pig iron can be made there at a very low cost under any conditions, owing to the fact that labor is the only element that can increase the cost of production on account of the abundant supply of raw material.

Our production of finished iron and steel from May 1 to October 31, inclusive, was 388,994 tons. Our production of muck bar from May 1 to October 31, inclusive, was 218,411 tons. Our output of pig iron from May 1 to October 31, inclusive, was 197,699 tons. Our daily output of pig iron since November 1 has been 1200 tons. The output of the six furnaces taken over by our company has been increased quite largely over what they were making prior to the time they were turned over to us, and are now making at the rate of over 400,000 tons per year.

The earnings of the company so far already exceed considerably the requirements for preference dividend for the entire year, and in view of the contracts made for future delivery and of the raw material secured to fill them there can be no doubt that the earnings for the first year will leave a very large surplus over and above the amount of the annual preference dividend.

New Publications.

FIRE PROOFING OF STEEL BUILDINGS. By J. K. Freitag. Svo, 319 pp., illustrated. John Wiley & Sons, New York. Price, \$2.50.

The author first considers the development of fire proofing methods and steel building construction, the earliest application of the present general system of fire resisting design being the use of the brick arch sprung between iron beams. The employment of wrought iron beams permitted a reduction of the distance between the walls to any desirable span, so that the deep and heavy brick arches could be made thinner and therefore lighter. The depth was finally reduced to one course of brick, which brought the weight down to about 33 to 35 pounds per square foot when set, to which was added a concrete filling of varying depth but averaging 8 to 10 pounds to each inch in thickness. In the earlier buildings the interiors were formed of cast iron columns, iron girders and iron floor beams carrying the brick arches. This left the lower flanges of the beams entirely exposed to the possible action of fire. An attempt to reduce the cost and dead weight of the brick arch method led to the introduction of the arch in which sheets of corrugated iron, curved, were sprung between the lower flanges of the I-beams.

The present systems of fire proofing resulted practically from the great Chicago fire in 1871. Flat hollow tile arches were introduced in Chicago in 1872, and shortly after in New York. These arches proved substantial, and served well the purpose of a light fire resisting floor. Previous to the year 1883 all of the tile arches used in Chicago had been made of tiles without interior webs except in the skewbacks. It was found that these tiles were not strong enough to sustain heavy loads, and the interior webs were introduced first in the building of the Mutual Life Insurance Company in New York. This type of arch was also used in the Home Insurance Company's building, Chicago, in 1883-1884, which was the first skeleton construction building erected.

At first iron was considered to be a fire proof material, and in the earlier constructions was not protected. The first attempt to protect the columns against fire was through the use of a double shell, one within the other, the intervening space being filled with plaster. The plaster was afterward abandoned and dependence placed upon the air space between the two casings. After 1886 architects generally began to specify iron columns to be incased in terra cotta blocks, and many of the present forms came into immediate use.

The author states that while mill construction undoubtedly possesses some decided advantages the accepted methods of "slow burning" construction have not been sufficiently "slow burning" in practice to warrant the extended use of the system. The objections to the use of this construction lie in the general employment of pitch pine for the longer and heavier timbers required in the system. This timber, when once ignited, makes a hotter and fiercer fire than even the light joists and lathing of non-fire proofing construction.

In the third chapter space is devoted to fires which have occurred during the last few years in modern fire proof buildings. The design of the several structures is analyzed and the faults brought prominently forward. In all of these cases it is clearly shown that with the modern skeleton construction, if the work be thoroughly done and the design strictly in accordance with the latest practice, a fire can be controlled, or at least confined to its starting point, and that the destruction of the building is next to impossible.

The results of tests of the well-known forms of fire proof floors are presented in such form as to be of the greatest value from the standpoints of the owner, architect, builder and underwriter.

The materials usually employed in fire proof building construction are cast iron, wrought iron, steel, stone, brick, terra cotta, mortars, plasters and concrete. It is stated that unprotected cast iron can stand practically unharmed in temperatures from 1300 to 1500 degrees F. while carrying heavy loads, while wrought iron or steel will commence to yield at temperatures from 1000 to 1200 degrees. The results of tests showing what we may term the yielding point due to heating are presented. Stone under the action of severe heat will crack or calce, according to its nature, and should therefore be most cautiously used in fire proof construction. The fire resisting qualities of brick and terra cotta are well known. Experiments made in Hamburg, Germany, on different mixtures of concrete showed that 1 part cement to 7 parts coarse cinders gave the best results. Fire was applied to this cement for three and three-quarter hours, when one sample was cooled suddenly and one slowly, but neither suffered under the test.

Chapter six considers the permanency of modern design, the effect of corrosion and the methods of guard-

ing against corrosion. The next division deals with the design of successful fire proof buildings, the essential points of which are enumerated as follows: The fire resisting detail of all structural portions of the building, adequate equipment to cope with either exterior or interior fires, and the proper planning of the general features.

This is followed by descriptions of floors of different types, methods of protecting floor beams and columns of different section and material. The author states that the present methods of so-called fire proof partition construction undoubtedly constitute the weakest feature in modern fire resisting design. An inspection of these partitions will reveal the fact that one of the most important functions has been overlooked—namely, the fire retarding quality. To fully meet the requirements these partitions should be fire resisting to such an extent as to limit the spread of fire, should possess heat retarding qualities, should have stability against shock, water streams, &c., and should have deadening qualities to prevent the transmission of sound. These are of the utmost importance, since the confining of a fire depends upon the integrity of the partitions. The usual methods of partition construction are described and a comparison presented of their various good and bad features.

The final chapters of the book treat of the exterior of the buildings, wall and roof, and the equipment to be provided for dealing with a fire.

The book is well arranged, the descriptive matter clear and concise, and there is a copious index. The entire subject has been admirably handled, and the data set forth should be of the greatest value to both the architect and owner.

DIRECTORY OF DIRECTORS IN NEW YORK. Published by the Audit Company, 120 Broadway, New York. Price, \$3.

The second volume has just been published of the Directory of Directors, an undertaking which the Audit Company started last year. It gives in alphabetical form the names and addresses of individuals in the city of New York who are connected as directors with public companies, enumerating the companies with which each is identified. In an appendix there is a list of the banks, the insurance and safe deposit companies, of manufacturing and miscellaneous companies, of transportation, telegraph, telephone and express companies, and trust companies, with their officers and boards of directors.

An Electrical Plant for New South Wales.—At Pittsburgh James O. Callender of Sydney, New South Wales, consulting electrical engineer of the Adelaide Development Company of London, England, has placed a contract with the Westinghouse Electric & Mfg. Company for the generating plant and equipment for the entire Adelaide traction system, the contract amounting to about \$500,000. The Adelaide Company, who represent a syndicate of London capitalists, recently secured control of all the tramway lines of Adelaide, South Australia, about 65 miles in length, and consolidated them under one company. It was decided that the old horse power should give way to electricity and negotiations were at once opened with the Westinghouse Company. Mr. Callender was sent to Pittsburgh to examine the plant of the company and the different designs of apparatus. He arrived a few days ago and completed his business, departing for Vancouver, B. C., to sail for Japan on his way home to Australia. Mr. Callender said that the initial horse-power would probably be 5000 and that the Westinghouse Company would furnish boilers, stokers, engines and all the electrical machinery for the plant complete. He said that the contract was to be finished within 12 months; at least the company were anxious to operate 50 miles of their electric line by that time. Mr. Callender said that it would take marvelous energy for the Westinghouse Company to furnish the engines within the time, if they built them themselves, as he had found that they had orders enough to keep the big plant busy for several years.

The *Electrical World* says that some idea of the extent to which the independent telephone movement is going may be formed from the fact that one manufacturer alone, who does not touch work for any of the smaller exchanges, has already equipped within the past year or so exchanges with 14,000 switchboard capacity, and now has orders on hand for large exchanges, although the cities are not among the largest, for over 20,000 switchboard capacity. In other words, his output alone will run about 35,000 switchboard capacity within about two years.

Frederick B. Slocum of the Newberry Building, Detroit, will handle the Bundy steam specialties of the A. A. Griffing Iron Company in Michigan.

Acetylene Lighting.*

BY F. CORTEZ WILSON.

In what I shall endeavor to present to you to-night it has been my object to give a brief outline of facts connected with the subject of acetylene lighting. This paper was written by the light of an acetylene flame from which I sought illumination, so any apparent dullness is not chargeable to the lamp. A very high authority states that at the creation of the world the edict went forth, "Let there be light." It is apparent that it became effective before "the morning stars sang together." I will omit reference to the efforts of man to produce artificial light from the days of the pine torch and the tallow dip down to electric lighting, which are matters of history familiar to you all.

I will assume that every person present knows what calcium carbide is, how it is made, when and by whom its process of manufacture was discovered and that from it acetylene is made by wetting. Even if you are not familiar with the technology of carbide it is sufficient for the every day requirements of a busy man to know that acetylene lighting for over two years has been reduced to successful practice. It has been my privilege to enjoy life in this world more than 60 years and witness the general utilization of many inventions and discoveries, and I believe that nothing of equal importance came into extensive use in anything like so short a period of time as acetylene. This may be accounted for by the fact that at no previous time has large wealth in the hands of men accustomed to risk it in business ventures been so available. Thos. L. Willson's original patents were sold to a syndicate of capitalists of New York, among them prominent patent attorneys and owners of large blocks of gas stocks, such men having a better appreciation of the magnitude of Willson's discovery than the average speculator.

Burners and Generators.

That difficulties in the practical use of the gas would be met with was to be expected. At first it was learned that owing to the richness of acetylene in carbon it was difficult to supply sufficient air to the burners to insure perfect combustion, and in consequence they would become clogged and in a comparatively short time fill the air with lamp black of purest quality. This difficulty has been overcome by the invention of burners especially designed to insure a sufficient supply of air. These burners act upon the steam injector principle, the stream of gas drawing in air before reaching the point of combustion, and there is now upon the market a variety of such burners which are satisfactory; but it is still inadvisable to turn the light down, as is done with ordinary gas, for the reason that the gas flow is not sufficiently rapid under such circumstances to draw in the necessary amount of air. The burners begin to carbonize, and if the practice is persisted in will in time become clogged and not do good service when the full flow is turned on.

It was also found that the main difficulty was in the generators more than the burners; that when carbide is slacked much heat is evolved by the chemical reaction, and acetylene being a very delicate gas the heat would polymerize or break up the gas, forming benzene, &c., which in burning fouled and clogged the burners and did not provide the light for which the consumer had paid. By the addition of water to carbide temperatures as high as 1353 degrees F. have been reached in experiments conducted for the purpose, the lumps of carbide becoming incandescent, and as the gas begins to break up at 140 degrees F., according to Professor Lewes, and certainly is destroyed for lighting purposes at about 400 degrees, it is easy to understand why so many generators have been unsatisfactory in use. It has been demonstrated that "1 pound of carbide evolves about 900 British thermal units while generating about 5½ cubic feet of acetylene, so that it would raise the temperature of 6 pounds of water from 62 degrees F. to the boiling point." (Henry Harrison Supplee in *Engineering Magazine*, August, 1897.)

It has been settled that no generator operating upon the spray or sprinkling system can give satisfactory results, as the gradual addition of small quantities of water to masses of carbide is sure to result in overheating.

There are generators that operate upon the overflow plan, i.e., carbide is put into a number of pans separated by partitions, the water is made to flow into one until the carbide is exhausted, and from this division overflows into the next and so on until all are hydrated. This is somewhat better than sprinkling, but as the flow of water is not continuous and the hydrated carbide cannot fall away from the lumps it retains the heat until it is raised to a point sufficiently high to damage the gas.

Generators made to dump the carbide in small quantities into large quantities of water are now upon the market and are theoretically correct. Their drawback is in the fact that much machinery for operating the various

devices is necessary and in the hands of the unskilled is liable to become damaged and refuse to perform its proper function, necessitating attention at a time when a light is necessary, and many accidents have resulted in consequence.

Dangers from Illuminants.

Do not understand me as saying that such accidents have been more frequent with such dumping generators, but rather that many accidents have resulted from the failure of different generators to work. Speaking of accidents, I would say that most of them are due to ignorance or carelessness. Any illuminating gas or vapor mixed with air in proper proportions forms an explosive. Acetylene does not differ from other gases (which have been almost universally used for the past 80 years in large cities) in this regard, excepting that on account of its richness the percentage of air required to form explosive mixtures covers a wider range than with leaner gases, some experimenters claiming that mixtures of from 5 to 76 per cent. of acetylene are explosive, while others equally reliable state that mixtures of over 56 degrees are not explosive. Such mixtures do not explode spontaneously. Gas explosions are by no means confined to acetylene. Last year an explosion occurred in the Capitol Building at Washington, damaging it to the extent of about \$25,000 and causing a fire which destroyed priceless public records which cannot be replaced. A few years since an explosion was caused by city gas in the Boston subway, with resultant losses said to amount to millions. The gas works at Poughkeepsie exploded about a year or two since and two attendants lost their lives. The gas works at Jackson, Miss., were practically destroyed by an explosion within the last two years.

Electricity has been the cause of some disastrous fires, notwithstanding the very rigid inspection of underwriters' bureaus everywhere. Acetylene inspection is only an incident in the excellent electric inspection bureau of which Mr. Merrill is the chief engineer.

Last year 156 fires were caused by lamps in London. Statistics were compiled from the records kept by the fire patrol in Chicago a few years since which showed over 900 lamp explosions in this city from which fires resulted. How many exploded that were not reported it is impossible to say. In discussing the dangerous nature of acetylene people seem to forget that even a stone wall becomes dangerous to the person who stumbles at just the right time. I have been using acetylene for lighting at my factory for the past three years and in my residence for the past two and one-half years, in both risks with the permission of the insurance companies interested.

Experimenting.

Consulting Engineer C. F. Thompson of Liverpool sums up the situation in his work, "Acetylene Gas, Its Nature, Properties and Use," so well that I will quote him: "The extreme simplicity of the process by which acetylene may be generated, while being one of its chief advantages has at the same time proved a disadvantage owing to its very simplicity having attracted enthusiastic but unskilled amateurs and others, who have entered the field of experiment with a very imperfect knowledge of the nature or properties of carbide or of acetylene, the result being that in a few cases accidents have occurred through its agency, attended with more or less disastrous consequences. It is therefore the blind, unintelligent experiments of ignorant persons which constitute the real dangers of acetylene, and it has consequently suffered by the want of knowledge or carelessness of its votaries, the disastrous results of whose ill advised enthusiasm have had the effect of bringing into disrepute one of the most valuable articles which chemical research has evolved and electrical science made a commercial possibility."

"In all operations in which known physical conditions are involved or known substances employed, the possible or probable results, instead of being speculative or purely conjectural, may, by having due regard to natural physical forces and properties of matter and careful consideration of the factors in the case, be predetermined—theoretically—with more or less degree of accuracy before being practically tested by trial or so called 'experiment' In view of the fact that literature bearing upon all branches or departments of physical science is available experiments of a purely speculative character in the fields of chemistry or of mechanism are inexcusable. But if entered upon in ignorance or indifference to underlying principles or conditions involved, and with indefinite views as to the effects sought or thought possible of attainment, the most probable results will be waste of time and material, disappointment and perhaps even disaster. 'A little knowledge is a dangerous thing' and usually tends to beget one or other of two conditions of mind—namely, a childish and undefined fear on the one hand or a reckless temerity and indifference as to consequences on the other."

A Committee's Report.

An exhibition of acetylene generators held at the Imperial Institute, London, opened June 15, 1898, at which

* Paper presented before the Chicago Architectural Club, November 13, 1899.

some 25 generators (selected after examination by a committee) were set up and run for 30 days under uniform, strict conditions. The committee of seven prominent engineers and scientists made an exhaustive report, in which they state that "many types of acetylene gas apparatus can be so constructed as with ordinary precaution to be absolutely safe, and that lighting by acetylene need be no more fraught with danger than are any of the other forms of artificial lighting in general use." The committee also says that "we recommend that every apparatus sold should be accompanied with a written guarantee that it will light a specific number of burners, consuming a given quantity of gas per hour, over a consecutive number of hours without increasing the temperature in any part of the carbide receptacle above 442 degrees F., that is to say, the fusing point of tin."

In this recommendation we think the committee was very liberal, as if it is true, as some scientists have stated, that the gas begins to polymerize at 140 degrees F., they propose to permit the installation of poor generators if they are safe, which is also the practice of our local inspection bureau, a fact which should be known to persons contemplating the purchase of apparatus. Insurance approval covers one point only—namely, that of safety. Up to October 15 104 generators had been approved by the Underwriters' Bureau of Fire Protection Engineering out of 173 submitted, and we feel safe in saying that among those approved but a very small percentage will stand the test of time and use. In regard to the storage of carbide the committee says: "As to licenses for storing carbide of calcium, we consider that local authorities need have no hesitation in granting such licenses for storage, provided it be shown to their satisfaction that the material is properly packed and that it is intended to store it in some dry, well ventilated place."

In view of this the well meaning but ill directed efforts of some fire chiefs to procure legislation to prevent absolutely the storage of carbide within corporation limits and in some instances its transportation through the streets, became rather absurd.

It reminds me of the difficulties experienced in introducing coal gas. When that method of illumination was first discovered promoters desired to light the House of Parliament and made strenuous efforts to that end, and after laboring with the combined intelligence of the realm for about two years finally obtained the necessary authority, coupled with the proviso that the "pipes carrying the gas should be placed upon brackets at least 18 inches from the wall," showing that at the beginning of the nineteenth century human nature was much the same as we find it at its close. The "Encyclopædia Britannica" states that in 1801 "F. A. Winsor took up the subject (of gas lighting) with zeal and unwearied patience, which led to a recognition of the advantages of the system and the breaking down of the powerful prejudice which existed in England against the innovation." Notwithstanding this the people of Philadelphia over 30 years afterward presented a "remonstrance against lighting with gas" which contained these expressions: "Consider it a most inexpedient, offensive and dangerous mode of lighting;" "We consider gas to be an article as ignitable as gunpowder and nearly as fatal in its effects."

The London committee in their report state that some of the generators tested averaged an output of $4\frac{1}{2}$ feet of gas to the pound of carbide, while others run as low as 3.55-100 feet, involving a constant loss to the users of such generators of nearly 24 per cent. of their carbide.

Qualities of the Light.

The spectrum from the acetylene light is practically the same as the solar and the gas is being used by manufacturing photographers with much success. The quality of acetylene light being almost equal to sunlight, practically a pure white, in this respect it is superior to all other artificial illuminants, as owing to this fact all colors appear under its rays, the same as by daylight. Under proper conditions as to density and pressure the flame is perfectly steady and free from the flickering peculiar to common gas.

Acetylene possesses a peculiar and unmistakable odor of such a pungent and penetrating character as to render its presence apparent at once, and as its specific gravity is so near that of air it is diffused throughout the room instead of rising to the ceiling, hence leaks in pipes and fixtures are at once detected. Acetylene is much less poisonous than coal gas, being practically free from sulphuretted hydrogen and carbonic oxide, with which coal gas is always more or less contaminated, which constitute the really poisonous element. And right here is a matter well worth your consideration. It is well known that a conservatory cannot be lighted with coal gas, as the plants are destroyed by the poisons evolved from the lights. We conducted a few experiments which demonstrated that plants would thrive under acetylene light and assume their natural color. Tender shoots would become perfectly white in 36 hours when left in a dark place, but would assume their green dress with astonishing rapidity when

the acetylene light was turned on, a green hue being observable within five hours afterward.

In comparison with other hydro-carbon flames of equal lighting power that of acetylene is comparatively cool, a 24 candle power acetylene flame producing but little more heat than is developed by an incandescent light of equal power. Discomfort arising from vitiated or overheated air in coal gas lighted rooms is too common an experience to more than mention. The so-called "dangers" of acetylene and other objections raised by prejudiced persons ignorant of its properties or having interests that it is believed will be injuriously affected by the general introduction of the new illuminant, are purely imaginary and unworthy of serious consideration by intelligent people.

We do not contend that acetylene under present conditions is the cheapest light obtainable, but the cost is certainly reasonable and need not prevent any fairly well to do individual from enjoying its many advantages. Half a cent per hour for a 24 candle power light cannot be considered an extravagance. Some of our patrons have sent us certificates to the effect that acetylene does not cost them any more than coal oil did for lighting their stores and we are not prepared to dispute them. Candles are believed to furnish a cheap light. Let us see: At present good paraffine candles cost by the box about 10 cents per pound, and a candle weighing 1 ounce will burn from three to three and one-half hours, costing 5-24 cent per hour; 24 candles, equaling a $\frac{1}{2}$ -foot acetylene burner, would cost per hour 5 cents, or ten times as much as an equal amount of light from acetylene gas.

Comparison of Lights.

Prof. C. de Perrodil, in his work upon the subject, says: "All artificial lights except the Welsbach are due to the incandescence of carbon, and the composition of the rays depends only upon the temperature. If we class the principal sources according to their richness in refrangible rays they may be arranged as follows:

"Vegetable oil lamps, city gas flames, kerosene lamps, candles, incandescent lights, melted platinum, Drummond light, electric arc light, magnesium, acetylene, sunlight.

"The color and the composition of the light have a considerable influence upon illumination, more so than the surface of the illuminous source. White light seems to be the best, as it fatigues the retina less and is represented by daylight or sunlight. Of all other lights known to this day that given by the acetylene flame is the richer and most nearly approaches sunlight." ("Le Carbure de Calcium et l'Acetylene," by C. de Perrodil, Paris, 1897. Translation by *Progressive Age*.)

Gas Room.

Acetylene will stay with us and as its many merits become known home builders will demand it, and therefore the progressive architect will provide in his plans for a gasroom. It should be in the basement and have water and sewer connections, independent ventilation and daylight. For the ordinary residence it should be about 8 x 8, with a door 36 inches wide, a passageway to it of the same width to admit the introduction of the apparatus. For a large residence it should be 8 x 10, with a door and passage 42 inches wide.

As a small amount of gas escapes into the room when the apparatus is recharged there should be a tightly closing door and a ventilator to carry outside the gas that escapes from the generator at such times and also that given by small lumps of carbide that are liable to be scattered upon the floor by careless persons. There should also be an opening through the wall about 12 inches square upon a level with the ground through which to pass the pans of residuum. Of course the gas room should be in such location as will be secure from hard freezing. The sewer should lead direct to a catch basin outside the house, conveniently arranged to permit the removal of lime deposits, and no other drains should empty into this catch basin. The lime water from this basin, if conducted through the rest of the system, would have a deodorizing effect. In closing we desire to acknowledge our obligation to G. F. Thompson, Prof. Vivian B. Lewes, Henry Harrison Supplee, C. de Perrodil, Pictet and others.

Selecting a Generator.

In selecting a satisfactory generator the salient points that should be carefully looked to are:

It must get out of the carbide all the gas it will produce; it must not overheat the gas; it must supply gas under uniform pressure; it must not require attention except to recharge; it must store all gas generated after lights are shut off; it must be readily freed from residuum; it must not have working parts to become disarranged; it must have ample capacity; it must have underwriters' approval.

First cost is the last thing to be considered. A good generator is a good investment at a fair price, but a poor generator is dear as a gift. Relative cost of maintenance determines which is the cheapest apparatus.

The Iron and Metal Trades.

The event of the week has been the announcement on the part of the miners of Lake Bessemer Ores of their prices for the season of 1900-1901. The figure decided upon, \$5.50 at lower Lake ports for the Norrie grade, compared with \$2.53 last year, represents an advance rather larger than was expected. This is equal to about 9.7 cents per unit, against a shade under 4.5 cents last year, thus representing an advance in the cost of Bessemer Pig Iron of about \$5.25 per ton for Ore alone. To this must be added the increased cost of Coke, at least \$1 per ton, of Iron, of labor, and of rail freights on raw materials, from receiving ports and from Coke ovens. Thus the Coke freights have been just advanced 15 cents per ton, and a rise in rail Ore freights is also imminent.

All this, of course, means that costs will be considerably higher, although the full effect will not be felt until the new Ore begins to appear in the mixtures. It is figured roughly that the cost of making Bessemer Pig in the valleys will, next year, not be less than \$14 to \$15 per ton for those who must purchase all their raw materials in the open market.

Of course it is true that only a comparatively small percentage of the Bessemer Pig made in the Central West is produced by concerns so situated. All the large companies, with very few exceptions, and many of the smaller ones, control a part or all of their own Ore and fuel, and therefore their costs are less by amounts varying with the conditions affecting each particular concern. But if the demand is large enough to require even a moderate quantity of metal turned out by what might be called the "outside" furnaces, their cost marks the possible attainable minimum of price up to June 1, 1901.

Of general interest is the announcement that the Non-Bessemer Ores are selling on the basis of \$4.25, lower Lake ports, or, say, 8 cents per unit. To makers of Basic and Foundry grades this means an advance very close to that of the producers of Bessemer Pig, and fixes a corresponding minimum for the second half of 1900 and the first half of 1901.

These prices for Lake Ores open excellent opportunities for active mining for the deposits east of the Allegheny Mountains, and it seems probable that, for instance, Lake Champlain Ores will go in very considerable quantities into the Pittsburgh and Cleveland districts.

Foreign Ores, it would seem, will also have much better opportunities. Thus we learn that Pilling & Crane of Philadelphia have, during the past week, sold for spring delivery between 175,000 and 200,000 tons of Newfoundland Ore to nine different concerns in the Eastern Pennsylvania districts at 7½ cents per unit, f.o.b. cars Philadelphia.

To the makers of Pig Iron in Virginia, Tennessee, Georgia and Alabama the establishment of the prices for Lake Ores and Coke hold out the promise of a year of good profits, because the majority of them control their own supplies. In the past they have suffered in competition with the Central West from the fact that prices of Lake Ores were down to a low level and all other costs were on a starvation basis. To them relatively a much larger margin is opened, since the offset to them is only the increased cost of labor and the advance in rates of freight on product to market.

The Lake Superior Ore mining interests did not this year in the least share in the prosperity of the Iron trade. They have determined to participate in the profits of the season of 1900-1901 and are sure to succeed.

The blowing out of a furnace is expected to bring a large interest in the Central West into the Bessemer Pig Iron market.

In Steel the only feature of interest is the appearance of a number of large inquiries in the Eastern markets.

A Comparison of Prices

At date, one week, one month and one year previous

Advances Over the Previous Month in Heavy Type.
Declines in Italics.

	Nov. 29, 1899.	Nov. 22, 1899.	Nov. 1, 1899.	Nov. 30, 1898.
PIG IRON:				
Foundry Pig, No. 2, Standard, Philadelphia.....	\$23.25	\$23.25	\$23.25	\$10.75
Foundry Pig, No. 2, Southern, Cincinnati.....	20.75	20.75	20.75	9.75
Foundry Pig, No. 2, Local, Chicago.....	23.50	23.00	23.00	11.00
Bessemer Pig, Pittsburgh.....	24.90	25.50	24.50	10.40
Gray Forge, Pittsburgh.....	21.25	20.50	21.25	9.25
Lake Superior Charcoal, Chicago.....	25.50	25.50	25.50	11.50
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh.....	34.00	35.00	39.50	15.25
Steel Billets, Philadelphia.....	.....	38.00	42.00	17.00
Steel Billets, Chicago.....	.....	.....	.....	17.00
Wire Rods, Pittsburgh.....	.....	.....	.....	20.25
Steel Rails, Heavy, Eastern Mill.....	35.00	35.00	35.00	17.00
Spikes, Tidewater.....	2.65	2.65	2.65	1.40
Splice Bars, Tidewater.....	2.35	2.35	2.30	1.05
OLD MATERIAL:				
O. Steel Rails, Chicago.....	20.00	20.00	20.50	7.75
O. Steel Rails, Philadelphia.....	25.00	24.00	23.00	10.25
O. Iron Rails, Chicago.....	29.00	30.00	33.00	12.50
O. Iron Rails, Philadelphia.....	29.00	29.00	26.00	12.75
O. Car Wheels, Chicago.....	21.00	21.00	20.00	11.50
O. Car Wheels, Philadelphia.....	23.00	23.00	22.00	10.00
Heavy Steel Scrap, Chicago.....	19.00	19.00	17.00	7.75
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia.....	2.20	2.20	2.20	1.10
Common Iron Bars, Youngstown.....	2.10	2.15	2.15	.95
Steel Bars, Tidewater.....	2.45	2.50	2.50	1.10
Steel Bars, Pittsburgh.....	2.20	2.25	2.25	.95
Tank Plates, Tidewater.....	2.65	2.80	3.05	1.25
Tank Plates, Pittsburgh.....	2.40	2.50	2.60	1.12½
Beams, Tidewater.....	2.40	2.40	2.40	1.35
Beams, Pittsburgh.....	2.25	2.25	2.25	1.20
Angles, Tidewater.....	2.40	2.40	2.40	1.20
Angles, Pittsburgh.....	2.25	2.25	2.25	1.10
Skelp, Grooved Iron, Pittsburgh.....	2.00	2.00	2.00	1.10
Skelp, Sheared Iron, Pittsburgh.....	2.35	2.40	2.40	1.20
Sheets, No. 27, Chicago.....	3.00	3.00	3.15	1.90
Sheets, No. 27, Pittsburgh.....	2.90	2.90	3.00	1.80
Barb Wire, f.o.b. Pittsburgh.....	3.55	3.55	3.55	1.65
Wire Nails, f.o.b. Pittsburgh.....	2.95	2.95	2.95	1.25
Cut Nails, Mill.....	2.40	2.50	2.50	1.07½
METALS:				
Copper, New York.....	17.00	17.00	17.00	12.80
Spelter, St. Louis.....	4.15	4.25	4.75	5.25
Lead, New York.....	4.60	4.57½	4.57½	3.67½
Lead, St. Louis.....	4.41½	4.45	4.42½	3.55
Tin, New York.....	27.60	28.00	30.50	18.40
Antimony, Hallett, New York.....	9.75	9.75	9.75	9.00
Nickel, New York.....	40.00	40.00	36.00	35.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York.....	4.84	4.84	4.82½	2.85

Chicago. (By Telegraph.)

Office of The Iron Age, 805 Fisher Building, }
CHICAGO, November 29, 1899.

Trade is running along quietly, with little change noted from conditions reported last week. Car building interests are heaviest buyers.

Pig Iron.—Sales agents are feeling quite a pressure for more rapid deliveries. The scarcity of cars is interfering more seriously than ever with receipts from Southern furnaces and deliveries are not being made by Northern furnaces as rapidly as the necessities of consumers require. Large melters are continually kept on the ragged edge, being unable to accumulate stocks, but are persistently confronted with danger of finding themselves without sufficient Iron to keep their works running. Much more Iron could therefore be sold for quick delivery if it could be obtained. The inquiry for future delivery is less active, although a few inquiries are on the market for round quantities for the first half and some for the last half of next year. The sales reported during the past week have therefore not reached any considerable tonnage. Prices are firmly held by all makers and local Irons show a slight advance. We quote for cash as follows:

Lake Superior Charcoal.....	\$25.50 to \$26.00
Local Coke Foundry, No. 1.....	24.50 to 25.00
Local Coke Foundry, No. 2.....	23.50 to 24.00
Local Coke Foundry, No. 3.....	22.50 to 23.00
Local Scotch, No. 1.....	25.00 to 25.50
Ohio Strong Softeners, No. 1.....	25.00 to 26.00
Southern Silvery, according to Silcon.....	25.50 to 27.00
Southern Coke, No. 1.....	22.85 to 23.85
Southern Coke, No. 2.....	21.85 to 22.85
Southern Coke, No. 3.....	21.10 to 21.85
Southern Coke, No. 1 Soft.....	22.85 to 23.85
Southern Coke, No. 2 Soft.....	21.85 to 22.85
Foundry Forge.....	20.80 to 21.35
Gray Forge and Mottled.....	20.80 to 21.35
Southern Charcoal Softeners, according to Silcon.....	21.85 to 25.85
Alabama and Georgia Car Wheel.....	24.85 to 25.85
Malleable Bessemer.....	25.00 to 26.00
Standard Bessemer.....	..... to
Jackson County and Kentucky Silvery, 8 per cent. Silcon.....	32.00 to 32.50

Bars.—Bar Iron manufacturers report a fair volume of business, with principal sales to car builders. Specifications on contracts are coming in rapidly, keeping the

mills far in arrears on deliveries. Large consumers and jobbers are therefore not receiving shipments fast enough to satisfy their requirements. Some sizes are exceedingly hard to get. Absolutely no stocks are now held in this city of Rounds and Squares, 2 inches and larger, either in Iron or Steel. The demand for Soft Steel Bars has recently shown considerable improvement and prices are more firmly held than was the case last week. Mill shipments of Common Iron continue to be quoted at 2.30c. to 2.40c., Chicago; Soft Steel Bars at 2.35c. to 2.65c., and Hoops at 2.65c., base, for Bands. Jobbers report their sales for November having exceeded those of any similar period in their experience. Small lots from stock are quoted at 2.90c., minimum, for Bar Iron; 2.65c. to 3c. for Soft Steel Bars, and 3.90c. to 4c. for Norway and Swedish Iron.

Car Material.—Car builders are buying Bars, Shapes, Plates, &c., in good quantities. The demand from this source appears to be the best feature of the local market. Orders in several lines enumerated have run from 500 to 2000 tons, and more business of this character is in sight.

Structural Material.—The business at present coming up in this line is confined to moderate quantities. A little bridge work is being placed, but the demand for buildings has been running rather light. A few building projects of some importance are developing, but the outcome will, of course, depend upon the early settlement of the labor troubles in this city. The mills represented in this market are reported to be crowded with work and are three to five months behind on deliveries, so that the quiet condition prevailing in this territory is not having any effect upon them. Mill shipments are quoted as follows, Chicago delivery: Beams, Channels and Zees, 15-inch and under, and Angles, 3 to 6 inches, 2.40c.; Beams, &c., 18 inches and over, and Angles over 6 inches and under 3 inches, 2.50c.; Tees, 2.45c.; Universal Plates, 2.78c. A large business is being done in Shapes from local yards at prices showing quite an advance on rates for mill shipments.

Plates.—Car builders are quite a factor in the Plate trade at present and orders of 1000 to 2000 tons have been placed by several concerns. Some low prices are being made on Narrow Plates for their use. The general demand has been fair, both for mill shipment and from jobbers' stocks. Regular orders are quoted for Chicago delivery about as follows: Tank, 2.90c. to 3.05c.; Flange, 3.15c. to 3.25c.; Marine, 3.30c. to 3.50c.; Fire Box, 4c. to 5½c. Jobbers quote Tank from store at 3.25c. to 3.40c., and Flange, 3.50c. to 3.65c.

Merchant Pipe.—While trade is slackening up a little specifications are coming in quite freely from large consumers, who are working up material rapidly. Carload lots are quoted at 50 and two 10's and less than carload lots at 50, 10 and 5 per cent. Merchant Steel Boiler Tubes are quoted as follows: 1¼ to 1½ inches, 35 per cent. off on Steel or Iron; 2 to 2¼ inches, 50 per cent. off on Steel and 45 per cent. off on Iron; for 3-inch and larger, 52½ per cent. off on Steel, 47½ per cent. off on Iron.

Sheets.—The inquiry has perceptibly improved the past few days, but the market has not yet shown any recovery as to prices. Manufacturers are sharply competing with one another for any business coming up. The demand for Galvanized Sheets is better than for Black Sheets, but large buyers hesitate to place contracts for future delivery until they are certain that bottom has been touched. Mill shipments of No. 27 Black Sheets are usually quoted at 3c. to 3.15c., Chicago, and Galvanized at 75 and 5 to 75 and 10 per cent. Jobbers continue to report a brisk demand for small lots of Galvanized Sheets. They quote from stock at 3.25c. to 3.40c. for No. 27 Black, and 70 and 5 to 70 and 15 per cent. off for Galvanized.

Merchant Steel.—A little better demand has developed, but trade must still be characterized as quiet. Mill shipments, Chicago delivery, are quoted as follows: Smooth Finished Machinery Steel, 2.95c. to 3.05c.; Smooth Finished Tire, 2.80c. to 3c.; Open Hearth Spring Steel, 3.60c. to 3.75c., base; Toe Calk, 3.20c. to 3.50c., base; Sleigh Shoe, 2.75c. to 3c.; Cutter Shoes, 3.45c. to 3.65c.; Ordinary Tool Steel, 7c. to 7½c.; Special, 13c. and upward. Jobbers are quoting from store: Crucible Spring Steel, 6c. rates; Open Hearth Spring Steel, 5c.; Smooth Machinery Steel, 5½c.; Toe Calk Steel 4c.

Billets and Rods.—The situation shows no change, the local makers being unable to take additional orders.

Rails and Track Supplies.—Although inquiries are in hand for a large tonnage of Standard Sections of Steel Rails railroad companies have been slow to close contracts, but it is expected that some business will be done at an early day. Prices of Track Fastenings are as follows: Steel Fish Plates, 2.50c.; Iron Fish Plates, 2.50c. to 3c.; Spikes, 2.65c. to 2.75c.; Track Bolts, with Hexagon

Nuts, 3.95c. to 4c.; Square Nuts, 3.80c. to 3.85c.; Steel Links and Pins, 3.25c.; Iron Links and Pins, 3.15c.

Old Material.—Large consumers of Scrap Iron are buying a little more freely, except those who use Cast Scrap. Cast has latterly been accumulating considerably and prices are not so firmly held. Steel Melting Stock is in particularly strong demand, but dealers report a good supply steadily coming out. Approximate market prices are as follows per gross ton:

Old Iron Rails.....	\$29.00 to \$30.00
Old Steel Rails, mixed lengths.....	20.00 to 20.50
Old Steel Rails, long lengths.....	22.00 to 24.00
Relaying Rails.....	27.00 to 29.00
Old Car Wheels.....	22.00 to 22.00
Heavy Melting Steel Scrap.....	19.00 to 20.00
Mixed Steel.....	15.50 to 16.00

Following prices are per net ton:

No. 1 Railroad Wrought.....	\$24.00 to \$25.00
No. 1 Railroad Track.....	20.50 to 21.00
Dealers' Forge.....	18.00 to 19.00
Iron Fish Plates and Angle Bars.....	24.00 to 25.00
Steel or Mixed Iron and Steel ditto.....	19.00 to 20.00
No. 1 Cut Mill, for busheling.....	13.50 to 14.50
Pipe and Flues.....	13.00 to 13.50
Heavy Cast.....	15.00 to 15.50
Stove Plate.....	10.25 to 10.50
Railroad Malleable Cast.....	16.50 to 16.50
Agricultural Malleable Cast.....	15.00 to 15.00
Iron Car Axles.....	30.00 to 30.00
Steel Car Axles.....	24.00 to 24.00
Horseshoes.....	18.00 to 19.00
Cast Borings.....	10.00 to 10.50
Steel Car Axle Turnings.....	12.50 to 13.00
Iron Car Axle Turnings.....	13.50 to 14.00
Machine Shop Turnings.....	12.00 to 12.25
Old Boilers, Iron, whole.....	8.00 to 9.00
Old Boilers, Iron, cut.....	13.00 to 14.00
Old Boilers, Steel, whole.....	7.00 to 8.00
Old Boilers, Steel, cut.....	12.00 to 13.00

Metals.—An error was made last week in printing the price of carload lots of Lake Copper, which should have been 17½c. The market this week is unchanged from that figure, and Casting Copper is also steady at 17½c. Corroding Lead has advanced 5c. per 100 lbs. and is now held at 4.60c., while Desilverized is unchanged at 4.55c. The Western demand continues much less active than that coming from the East. Spelter has advanced, sales having been made this week at 4.35c., and in some cases a little higher, for carload lots.

Tin Plate.—The demand has latterly been quite fair, owing probably to the continued open weather, which enables outdoor work to be actively prosecuted. Prices are unchanged.

Philadelphia.

Office of *The Iron Age*, Forrest Building, }
PHILADELPHIA, PA., November 28, 1899. }

The situation has not changed much since date of our last report. Prices are easier, but they are not lower, except in spots, and even then it is due mostly to readjustments, which have been pending for several weeks past. Plates for instance were abnormally high, but with the enlarged capacity for production, prices have been brought to figures which place them in line with other specialties. Sheets have also had a sharp decline, but there have been special reasons for this, one being the suspension of work at a great many of the mills owned by the Tin Plate Trust. In other directions about all that can be claimed is that buying is less urgent, deliveries somewhat easier to obtain, and here and there fractionally lower prices have been named. The general feeling, however, is not weak by any means. There is an enormous business in sight, and the consumption of Iron and Steel is maintained at the highest limit yet attained, but there will naturally be some falling off during the next few weeks, and it is with this in prospect that buyers are disposed to hold off. Sellers stand face to face with much higher costs during the coming year, consequently they are in no mood for cutting down their quotations, and are not likely to do so unless something very unforeseen occurs. From this it will be seen that the stand-off is quite natural, and will probably continue until there are some distinct evidences to favor one side or the other. The immediate chances, however, are for a comparatively quiet market, with little or no change in prices.

Pig Iron.—Rather a quiet market has been reported during the past week. Immediate requirements have been pretty well provided for, and in some cases probably a large portion of the first half of the coming year has been covered. Dullness at a time like this therefore, is simply a normal condition, and is no indication of anything like a culminating point of the extraordinary activities of the past 10 or 12 months. With prices about double what they were a year ago, it is not surprising that there is more or less hesitancy, it is in fact the time for a careful review, and for serious consideration in regard to the position to be assumed during the coming year. There is no doubt that the majority of people find

themselves in a vastly better position than they calculated upon a year ago, and they naturally want to hold what they have got; hence a great deal of thinking is being done preparatory to a renewal of operations on a large scale. So far, however, there is a general disposition to accept to-day's prices as tolerably safe for the greater portion of next year, but all the same buyers want to see a movement before falling into line. Inquiries for prices have been very numerous during the past few days, but the applicants seem to consider the quotations as short options and treat them accordingly. The impression is that prices are a little lower; and, in fact, consumers claim that they can do 50c. to \$1 per ton better, but the most rigid inquiry fails to unearth anything of that kind as actual transactions, except for entirely new, or off-grade Irons, so that we make no change in quotations, although it must be conceded that the market is very sensitive, and under pressure to sell might possibly yield to the extent named. The range at this time is about as follows for Philadelphia or its equivalent: No. 1 X Foundry, \$25 to \$25.50; No. 2 X Foundry, \$23.25 to \$24.25; No. 2 Plain, \$22.25 to \$22.75; Standard Mill Iron, \$20.25 to \$21; Basic, \$23 to \$23.50; Bessemer, nominal, \$25 to \$26; and Low Phosphorus, \$27 to \$28, f.o.b. cars, furnace.

Billets.—No business of any account has been done in this vicinity, owing to the incompatibility of opinions in regard to prices. Nominal quotations are about \$40, but there is little doubt that better than that could be done providing firm offers were made. Steel will be wanted soon after the turn of the year, but the high prices ruling for Pig Iron will probably prevent anything but very moderate concessions from the present asking prices.

Muck Bars.—Prices are very irregular; buyers consider \$31 delivered as a full price, while sellers quote that figure firm f.o.b. cars at their mills.

Plates.—The demand is still quite large, but prices have developed a good deal of weakness. This is no doubt due to the fact of new mills getting ready for operations, as well as to the largely increased capacity of others that have been run continuously. Similar conditions in the West have also caused a weakening in that direction, so that even with as large a demand as before, prices are not likely to be as rampant as they were during the past two or three months. Prices for seaboard or equivalent deliveries are about as follows: Steel Plates, 1/4-inch and thicker, 2.65c. to 2.75c.; Shell, 2.80c. to 2.90c.; Flange, 3.15c.; Fire Box, 3.30c.; Charcoal Iron Plates, C. H. No. 1, 3.10c.; Best Flange, 3.60c.; Fire Box, 4.10c.

Structural Material.—There is some falling off in the demand for Structural Material, but the mills have plenty of orders in their books, so that full time can be maintained in pretty nearly all departments. The material for the new hotel in Atlantic City is to be furnished by the Pencoyd, and will require about 2500 tons, which is to be all taken during the winter months. Prices are about as follows (seaboard or nearby deliveries): Beams and Channels, 15 inches and under, 2.40c.; Angles, 3 to 6 inches, 2.40c.; Zee Bars, 2.40c., f.o.b. Philadelphia; Angle Bulbs and Deck Beams, 2.63c.; Tees, 2.45c.

Bars.—There is a good demand for Bars, and mills are well supplied with orders, but prices are a shade easier, with some sales at about a tenth under the official figures, which were reaffirmed on last Friday as follows for delivery at seaboard or nearby points: Ordinary Iron, 2.10c. to 2.15c.; Refined Iron, 2.20c. to 2.25c.; Test Iron, 2.30c. to 2.35c.; Steel Bars, 2.50c. to 2.75c.

Sheets.—There is not much doing at present, but at this season a period of dullness is always expected. There is a good deal of work under contract, however, so that full time can be continued until the close of the year, and besides that, stocks at mills are so much reduced that it will require some time to restore them to their normal condition. Prices, therefore, are not likely to show much change even if the dullness continues. Best makes are quoted as follows (Common Sheets two-tenths less): No. 10, 2.95c. to 3c.; No. 14, 3.10c.; No. 16, 3.15c.; Nos. 18-20, 3.20c.; Nos. 21-24, 3.30c.; Nos. 26, 27, 3.40c.; No. 28, 3.50c. to 3.60c.

Old Material.—Prices are said to be a good deal lower, but recent sales were as follows for deliveries in buyers' yards: Iron Axles, \$31 to \$31.50; Steel Axles, \$30.50; Steel Rails, \$25; Heavy Steel Scrap, \$22.50 up to \$23.50; No. 1 Railway Scrap, \$27, \$28 and \$29; No. 1 Yard Scrap, \$22.40 and \$23; Machinery Cast, \$18.50 and \$19; Stove Plate, \$15; Grate Bars, \$14; Turnings, \$16; Borings, \$15. Bids have been reduced, however, so that bids and offers are now about as follows for deliveries in buyers' yards: Cast Borings, \$14.50 to \$15; Wrought Turnings, \$16 to \$16.25; Machinery Cast, \$18 to \$19; Old Car Wheels, \$23 to \$24; Heavy Steel Scrap, \$22.50 to \$24;

Steel Rails, \$24 to \$25; Iron Rails, \$29 to \$30; No. 1 Yard Scrap, \$22 to \$23; No. 1 Railway Scrap, \$26 to \$28; Iron Axles, \$31 to \$32; Steel Axles, \$30 to \$32.

St. Louis. (By Telegraph.)

Office of The Iron Age, 512 Commercial Building, {
ST. LOUIS, November 29, 1899. }

Pig Iron.—Accustomed to advancing prices, consumers cannot entirely reconcile themselves to the comparative quietness prevailing. Concerns with stocks ahead are certain prices will move up. Foundrymen whose wants in 1900 have not been covered are equally positive that lower figures will prevail. As a matter of fact, no weak spot has developed nor is there present reason to anticipate lower prices. The consensus of the trade's opinion is that further advances will take place. Business transacted daily is of a scattering kind and for small lots, but aggregating a satisfactory November tonnage. December is expected to bring a heavy buying movement. Coke supply is not equal to demand and railroads report freight equipments as in greater need than ever. A meeting of traffic officials is being held in Chicago this week, and it is rumored that the rate on Coke from Connellsville to East St. Louis will be advanced 30c., making new rate \$2.55 per ton. We quote without change from last week, f.o.b. cars St. Louis:

Southern, No. 1 Foundry.....	\$22.25 to \$22.50
Southern, No. 2 Foundry.....	21.50 to 21.75
Southern, No. 3 Foundry.....	20.25 to 20.50
No. 1 Soft.....	22.25 to 22.50
No. 2 Soft.....	21.75 to 21.75
Gray Forge.....	20.00 to 20.25

Bars.—The manufacturing interests are said to be continuing their purchases without much let up. Street and railway car builders are filled up with work. Freight car builders have difficulty in obtaining the various materials required and in several instances lately have been forced to temporarily suspend operations in certain departments. Railroads are pushing work in their company car shops and the Bar Iron and Steel in daily consumption is unusually large. The end of the year approaching, jobbers are easing stock a bit in order to carry no abnormal supply into next year. No change is shown in prices, and mills quote Bar Iron at 2.35c. to 2.50c., base, half extras, in car lots, East St. Louis. Small lots are had of jobbers at 2.75c. to 2.90c., full extras. Steel Bars are unchanged at 2.50c. to 2.75c., base, half extras, carloads, East St. Louis. Jobbers ask 3c., full extras, out of stock.

Rails and Track Supplies.—Prices remain as last week and sales for this time of year are not complained of. We quote: Splice Bars, Steel, 2.55c.; Iron, 3c. to 3.50c.; Track Bolts, with Square Nuts, are now 3.80c.; with Hexagon Nuts, 3.95c.; Spikes, 2.85c.; Steel Links and Pins, 3.20c.

Pig Lead.—The market is very strong, with Desilverized and Chemical salable at 4.47½c. Producers say they are sold up for December. There seems to be a fair tonnage of Pig Lead in brokers' hands, however. Lead Ore sold last week at \$27 per 1000 lbs.

Spelter.—The depressed state keeps on, but there are signs that a change for the better will soon take place. A great many telegraphic inquiries have reached St. Louis to-day, and, while the offers range only from 4.15c. to 4.20c., St. Louis, the fact that interest is aroused casts some encouragement on the situation. While the top price reached on Zinc Ores was \$32.50 per ton, \$30 represents the all round price of high grade Ores. Lower assay Ores are not much wanted when a choice of something better can be made.

Cincinnati. (By Telegraph.)

Office of The Iron Age, Fifth and Main streets, {
CINCINNATI, November 29, 1899. }

With no appreciable change from the conditions which have ruled for the past few weeks the market for Pig Iron has rounded out another week with quite a fair tonnage sold. The deliveries are widely extended for which contracts are now being made. One lot of Northern Malleable Iron consisting of 3500 tons was booked for delivery from July 1 to December 31, 1900. This sale is reported at the highest quotation basis yet made and fills the furnace making the sale so completely as to cause their withdrawal from the market until after the first of 1901. One lot of 2500 tons No. 1 Southern Foundry is reported at about 25c. more than to-day's quotation. Outside of these two sales there are none reported for over 500 tons. While the market generally is firm and unchanged, yet there is still some Iron selling at less than inside figures. No. 3 Southern Foundry is said to be offering at \$16.25 and Gray Forge and No. 4 Foundry has sold at \$15.75, Birmingham. Iron for close delivery is still very scarce and consumption is showing

no signs of decreasing. Notice has been given that freight rates north of the Ohio on Southern Iron are to be advanced an average of 15c. on January 1. Coke is eagerly sought after and consumers are paying top prices and urging heavier deliveries, with but little success in increasing deliveries. Large consumers of Pig Iron are, as a rule, keeping out of sight just now, so far as making inquiries for new business is concerned. We quote, f.o.b. Cincinnati:

Southern Coke, No. 1.....	\$21.75
Southern Coke, No. 2.....	20.75
Southern Coke, No. 3.....	19.75
Southern Coke, No. 4.....	19.50
Southern Coke, No. 1 Soft.....	21.75
Southern Coke, No. 2 Soft.....	20.75
Southern Coke, Gray Forge.....	\$19.00 to 19.50
Southern Coke, Mottled.....	19.00 to 19.50
Ohio Silvery, No. 1.....	30.00
Ohio Silvery, No. 2.....	29.00
Lake Superior Coke, No. 1.....	\$23.50 to 24.00
Lake Superior Coke, No. 2.....	22.50 to 23.00

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, Chilling Grades.....	\$24.75
Standard Southern Car Wheel, No. 2.....	23.75
Lake Superior Car Wheel and Malleable.....	25.00

Plates and Bars.—The market is fairly active and steady at last week's figures. We quote, f.o.b. Cincinnati: Iron Bars, carload lots, 2.25c., with half extras; small lots, 2.60c., with full extras; Bar Steel, in car lots, 2.50c., with half extras; small lots, 2.95c., with full extras; Iron Bar Angles, 1½ x 3-16 inch and larger, in car lots, 2.65c.; small lots, 2.80c.; Sheets, No. 10, 3.15c.; No. 27, Stove Pipe, 3.25c.; No. 27, Steel, 3.35c.; Plates, 3c. to 3.10c.

Old Material.—There is no change in the general conditions and prices are holding steady on last week's basis. We quote, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, \$22 to \$23 per net ton; Cast Scrap, \$15.50 to \$16 per gross ton; Axles, \$26 to \$27 per net ton; Iron Rails, \$28 to \$29 per gross ton; Car Wheels, \$20 to \$21 per gross ton.

Rogers, Brown & Co. report that the Cherokee Furnace of Cedartown, Ga., will blow in December 15 and will devote its energies to the production of Charcoal Iron.

Pittsburgh.

Office of The Iron Age, Hamilton Building, }
PITTSBURGH, November 29, 1899. }

(By Telegraph.)

Pig Iron.—The principal event of the week has been the fixing of the price of old range Ores at \$5.50, lower lake ports, for next year, an advance of \$260 a ton over this year. To large interests like Carnegie Steel Company and Jones & Laughlins, Limited, and others who have their own Ore properties this advance will not cut much figure, except in the way of increased royalties, which will have to be paid. To the furnace that has not Ore connections and must pay \$5.50 a ton for Ore, \$2.60 or higher for Coke, and higher limestone and wages, it means a cost of making Bessemer Iron ranging from \$15 to \$17. Of course many of the furnaces have enough old Ore to run them into the summer or fall of 1900.

There has not been much done in Bessemer Pig Iron in the past week. Some small sales have been made, aggregating 8000 to 10,000 tons, for early delivery at prices ranging from \$25 to \$25.25 or higher, Pittsburgh. For Iron for first half \$24, at furnace, is asked, equal to \$24.90, Pittsburgh, as the rate after January 1 from the Valleys will be 90c. The large consumers of Bessemer Iron are pretty well covered and the situation is likely to be quiet until after the first of the year. Gray Forge is very strong and has sold at \$21, Valley, plus switching charge. Foundry Irons are also firm and \$23, Pittsburgh, for No. 2 is minimum with most furnaces. We quote: Standard Bessemer, \$24; Gray Forge, \$21, both at Valley furnace; No. 2 Foundry, \$23 to \$23.25; Gray Forge, \$21.25 to \$21.50; Bessemer, \$25 to \$25.25, all f.o.b. Pittsburgh. We note sales of about 8000 tons of Standard Bessemer for this and next month at \$25 to \$25.25, Pittsburgh. Also a sale of about 18,000 tons of Standard Bessemer for first quarter at a price equal to about \$24, Valley; also a sale of 300 tons of Gray Forge at \$21, Valley furnace.

Steel.—The Steel market is exceedingly quiet and practically nothing is doing. Buyers are holding off, waiting for lower prices. One small lot of Steel has been sold for second quarter at a price slightly above \$35, Pittsburgh. From \$35 to \$36 is being quoted, the price depending on deliveries wanted. It is not unlikely \$35 for Billets for first half for large tonnage would be shaded. Basic is very quiet and prices are lower. The mills quote about \$45, but some Basic Steel has been re-sold at lower prices.

Sheet Bars.—The market is very dull and we quote nominally at \$36, delivered.

Muck Bars.—The price of Muck Bars is a little higher, owing to the advance in puddling and finishing. It was offered here some time ago at about \$32.50, Pittsburgh, but we note a sale of 1200 tons at \$33.25, Pittsburgh.

Spelter.—Prices are still lower and we quote prime Western grades at 4.35c., Pittsburgh.

(By Mail.)

The price of Old Range Ores for next year has been fixed at \$5.50 a ton, lower lake port. The price last year was \$2.90, showing a clean advance of \$2.60 a ton. It is understood that some of the smaller independent Ore producers stood out for \$6 a ton, and a compromise was effected at \$5.50 a ton. With an advance of \$2.60 a ton on Ore alone, and also higher freights, the cost of making Pig Iron next year by furnaces that will have to buy Ore, from the Ore standpoint alone, will be all of \$5 a ton or more. Coke is considerably over a dollar a ton higher, labor has had three or four advances, and freights are higher, so that the cost of making Bessemer Pig Iron next year by furnaces using new Ore and higher priced Coke will probably be \$14 or \$15 a ton. With some furnaces it may be higher. The week has been comparatively quiet, but some small lots of Bessemer Iron for prompt shipment have been sold at prices ranging from \$24.85 up to \$25 and higher, Pittsburgh. Nothing has been done for next year, but the furnaces asked about \$24. Steel is very quiet, and the market is from \$35 to \$37, with a probability that a nice tonnage might be placed under \$35. Buyers are holding off waiting for lower prices. Finished Material, as a whole, has been quiet, but on some lines prices are strong and on others weak. The present condition of quietness is likely to continue until after the first of the year, when a considerable increase in tonnage is expected. It is generally conceded that the top has been reached and the hesitancy in placing orders by buyers is thus explained.

Ferromanganese.—Domestic continues scarce, and is bringing \$100 in carload lots, and up to \$125 in small lots for spot shipment. Some foreign Ferro has recently been sold in this market.

Plates.—The situation is somewhat quiet, when compared with the intense activity two or three months ago. Some of the smaller Plate mills that can roll up to 60 inches wide, are in need of tonnage, and are quoting as low as 2.40c., Pittsburgh. Mills rolling wide sizes quote 2.60c. or higher, so that a fair range of prices on Tank, ¼-inch and heavier, is 2.40c. to 2.60c., the lower price for narrow sizes. Shell is 2.60c. to 2.70c.; Flange, 2.70c. to 2.80c.; Marine, 2.80c. to 2.90c.; Fire Box, 3c. to 3.75c., all f.o.b. maker's mill.

Structural Material.—A local mill is furnishing the Shapes for the new Trust Building in Cincinnati, which will take some 2600 tons, and the same mill have taken the material for the Brooklyn Navy Yard, about 2500 tons. A good many small orders are being placed, which amount to considerable tonnage. Both local mills are pretty well filled up for some time. Beams up to 10 and 12 inches spot shipment bring high prices. We quote: Beams and Channels, 15-inch and under, 2.25c.; 18, 20 and 24 inch, 2.35c.; Angles, 3-inch and up to 6 x 6, 2.25c.; Angles, under 3-inch, 2.50c.; Tees, 3-inch and larger, 2.30c.; under 3-inch, 2.50c.; Zees, 3-inch and larger, 2.25c.; Grooved Rolled Plates, 2.50c., Pittsburgh.

Rails.—Nothing special is being done. We quote at \$35 to \$37 at mill, for Standard Sections.

Bars.—There is a fair amount of tonnage being placed, but the situation is quiet, as compared with the tremendous volume of business two or three months ago. Some of the mills are pretty well caught up, and are actively seeking tonnage. Here and there a mill is reported to be running partly on single turn. We quote Common Iron Bars at 2.10c. to 2.15c., Valley, the freight to Pittsburgh being about 5c. Local mills quote 2.35c. to 2.40c. for high grade Bars, and some sellers ask higher prices. The market on Steel Bars is weaker, with some mills that are pretty well caught up on old orders. Other

mills that have a good deal of tonnage are very firm in their views as to prices. For this reason there is a good deal of range in prices being made by different mills. We quote at 2.25c. by outside mills and 2.40c. by local mills. It is possible that a few sellers might shade our lower quotations, while on the other hand one or two mills are reported to be quoting higher prices.

Sheets.—The Sheet trade is in about the same condition as noted in this report for some time. This is the dull season of the year in Sheets, and prices are manifestly weak. Some of the mills have very large stocks, and are offering special inducements to buyers in order to reduce them. It is understood that present prices of Sheets are below cost of production, based on \$36 Bars. For this reason a reaction in prices after the first of the year, if not before, is expected. We quote No. 27 Black Sheets, one pass, at 2.90c. to 2.95c.; No. 28, 2.95c. to 3c. It is possible that on a very nice specification and large tonnage these prices might be shaded by some mills. On the other hand there are mills that are quoting considerably higher. Galvanized Sheets continue weak, and some very low prices have been made in special cases. We quote at 75 to 75 and 5 per cent., with 15c. freight, for carload lots.

Merchant Steel.—There is nothing of special interest to note. A good deal of tonnage is being placed, which, with old contracts, keeps the mills well filled up. Prices are strong, and we quote: Toe Calk, 2.75c., base; Tire, 2.75c., base; Open Hearth Spring, 3.25c. to 3.50c.; Plow Slabs, 3-16 and heavier, 2.75c. to 3c.; Bessemer Machinery, 2.75c. to 3c.; Sleigh Shoe, 2.75c. to 3c.; Cutter Shoes, tapered and bent, 3.75c. to 4c.; Cant Hook Steel, Open Hearth, 4c. to 4.25c.; Crucible, 5c. to 5.25c.; Tool Steel, 7c. and upward, depending on quality. Terms, net cash 30 days.

Skelp.—There is very little doing in Skelp, and some of the mills are making low prices to secure tonnage. We quote Grooved Iron and Steel Skelp at 2c. and Sheared at 2.35c. to 2.40c., buyer's mill. It is probable that for a good order these prices would be shaded by some mills. We note a sale of 150 tons of Grooved Iron Skelp at 2c., delivered.

Pipes and Tubes.—Tonnage for November is holding up remarkably well, and is reported as being considerably larger than in October. The tone of the market is strong, and jobbers advise us they have no difficulty in getting full prices for less than carload lots. There is a large order in the market for Pipe and Fittings for the Kobe Water Works in Japan. Some local mills are figuring on the work. We quote Black and Galvanized Merchant Pipe at 50 and two 10's delivered, in carload lots, and smaller orders at 50 and 10 to 50 and 10 and 5 per cent. at mill. Demand for Oil Well Casing is only fair. We quote Screw and Socket Joint Weld Casing at 37½ per cent., and Inserted Joint at 32½ per cent., with an optional 5 per cent. to dealers. Boiler Tubes are in good demand, and prices are strong. We quote: 1¼-inch and 1½-inch Iron, 40 per cent.; Steel, 40 per cent.; 1¾ to 2½ inch Iron, 50 per cent.; Steel, 55 per cent.; 2¾-inch and larger Iron, 52½ per cent.; Steel, 55 per cent., with an extra 5 per cent. in carloads; less than carloads, f.o.b. maker's mill, Pittsburgh, while carloads are delivered.

Connellsville Coke.—Last week 18,372 ovens in the Connellsville region were active and 934 idle, the output being 194,604 tons. The Acme Coke Company have completed 50 ovens in the region and 32 are in blast. Prices on Coke are very strong, and Furnace Coke is quoted at \$2.75 to \$3 and Foundry Coke at \$3 a ton at oven.

Cleveland.

CLEVELAND, November 23, 1899.

Iron Ore.—The Association of Producers of Old Range Bessemer Iron Ores, upon whose scale of prices the selling quotations for the year are based, held its first meeting the latter part of last week and others will speedily follow. It is expected, however, that, as is usually the case, several of these preliminary gatherings will be required before any definite determination as to prices can be arrived at. Meanwhile some producers of Mesabi Non-Bessemer have proceeded with sales of their product regardless of the action of the association, and sales are reported at \$4.25 and better. There is every indication that the "bullish" element is in the ascendancy in the association, and it is almost certain that the base price on the high grade Ores will be \$5.50, as against \$2.95 for the present year and \$2.75 for 1898. A number of lake steamers in the Ore trade changed hands last week, among others the steamer "Quito," which was sold by the Tonawanda Iron & Steel Company to Capt. James Corrigan of Cleveland. Ore men are overjoyed by the prospect that the roads which carry the Ore from the mines to the shipping docks at upper lake ports will

have improved facilities next season. This has been the weak link in the transportation system.

Pig Iron.—The market has shown during the past seven days no marked change over the week which preceded it. The general condition of the market does not show up favorably in comparison with the greater activity manifest in the Eastern markets during the past few weeks, but local sales agents take a philosophical view of this phase of the situation, contending that it is to be expected in view of the activity of the market in this section all through the summer and autumn, when conditions were rather better than prevailed in corresponding lines in the East. Moreover, it seems apparent that the easing of the market is distinctively a temporary lull rather than any actual weakening, a fact evidenced by the maintenance of all quotations. The fewness of sales may further be attributed to the fact that the Iron is pretty well covered for the first half of the year in all grades, and little or no buying need now be expected before next month. The Bessemer market would be accounted strong at \$23.50. There is a difference of \$1 in the generally accepted quotation on the different grades of Foundry Iron, No. 1 being quoted at \$23.50 and No. 2 at \$22.50. Lake Superior Charcoal is down at the same nominal quotation as for some weeks past and Gray Forge holds steady at \$21. Even the few odd lots of Iron available for delivery during the remainder of this year which have come into the market at intervals during the past month now seem to be exhausted, and no sales of small lots for December delivery were reported last week even at fancy prices. The car situation seems to have improved somewhat and furnace men will likely have less difficulty in moving the small amount of Ore remaining on the Lake Erie docks or yet to come down from Lake Superior.

Finished Material.—Inquiry during the week has been good, but not a great deal of business has been closed up. The largest single transaction was a sale of Plates to a local firm who are constructing Ore and Coal machinery to be installed at the new plant of the Dominion Iron & Steel Company at Sydney, Nova Scotia. Little has been doing in Structural Material and the only sale of Railroad Iron was for use as Splice Bars for a suburban electric line in Northern Ohio. A weakening in Plates and Bars has been reported in some quarters, but sales agents claim that it has not been generally manifest. There is still an excellent demand for Bars at 2.50c. to 2.60c. and the demand for Boiler Plates is excellent at 2.80c. to 2.90c. The Sheet market is still in rather unstable condition, as a result of well-known conditions which exist temporarily in that line.

Old Material.—The past week has seen some changes in the status of the market. In some cases there has been an improvement of prices and in others a decline. Thus Steel Melting Stock, No. 1 Wrought, No. 1 Cast Car Wheels and Iron Rails are each quoted lower by from 50c. to \$1 per ton, while Turnings and Borings show corresponding advances. So far as supply and demand are concerned, there has been little change. There is a very fair inquiry for all kinds of Scrap and a goodly amount of material is moving. Sales during the week have been at the following prices: Steel Melting Stock, \$21, gross; No. 1 Wrought, \$24, net; No. 1 Cast, \$17.50, net; Car Wheels, \$21, gross; Iron Rails, \$30, gross; Turnings, \$15, net; Borings, \$13.25, net.

(By Telegraph.)

Producers of Non-Bessemer Iron Ores of the Lake Superior region met in Cleveland on Tuesday and practically agreed upon a base price of \$4.25 a ton, as against \$2 a year ago. Another meeting is to be held on Monday next, but it is not probable that this price will be changed as a result of anything that may occur in the meantime.

The Bessemer Association has held a meeting, and it has been decided that the base price for the old range Bessemer will be \$5.50 a ton, as against \$2.90 a year ago. For some mysterious reason the management of the Biwabie Mine, one of the finest Bessemer properties of the Mesabi, has sold large quantities of Ore for next year at \$4.25. This action has, however, had no effect on the producers of other leading Mesabi Ores, who will undoubtedly demand \$5 to \$5.25 a ton. It is supposed that the action of the Biwabie people has been induced by furnace owners in the hope of influencing the price. The decision of the Bessemer Association for a \$5.50 price was a practically unanimous action.

Some satisfactory tests are being made at Sandy Hook with the Miller conveyor for coaling vessels at sea. The tests were made by the battle ship "Massachusetts" and the collier "Marcellus."

Birmingham.

BIRMINGHAM, ALA., November 27, 1899.

So far as the demand for Iron is concerned the past week was rather quiet. There was the usual run of small orders, and there was no difficulty in obtaining 50c. over the prices accepted as quotations; but there was not sufficient business to characterize the market as active. The sellers manifest no anxiety whatever to push business, as enough comes of its own volition to absorb all they care to sell. As to delivery, buyers are showing more confidence in the stability of prices, as a fair share of the orders placed the past week were for delivery the first quarter of the second half of 1900. Heretofore these buyers refused deliveries beyond the first half of 1900. Now they are taking what they can get. There were no large orders in the market, and if there were they could not be satisfied short of last half of 1900 delivery. A very prominent official in the Iron world said in discussing the situation: "I don't see how a further advance can be avoided. Our information is that several large interests can delay entering the market but a little while longer. Their wants will be large, and these added to the constant current business will create an active demand, and competition between buyers will enhance prices. At one of our furnace plants visited by me I found the yards absolutely bare of iron, and the condition of our sales book justifies the assertion that we can accumulate no iron for long months ahead."

The suggestion was made in last week's letter that if there was any recession in prices it would not go below the point acceptable to the foreign trade. The only feature of interest in the trade this week is the sale of 2000 tons to Genoa, Italy, at current domestic prices. And the week closes with several other offers out awaiting acceptance. The freight to Genoa is \$3.92 to \$4.25. Delivery of this Genoa order is December to February. The successful working of this order created fresh confidence in prices, and there is little fear of a sagging market with foreign buyers taking hold at current values.

Cars have been furnished more freely of late, and shippers are up, or nearly so, to current make. The great Steel plant is at last ready for operations, and the first run of Steel is being made as this is written, under the supervision of Mr. Williams of the Wellman Seaver Engineering Company, Cleveland, the constructing engineers of the plant. According to the contract the supervision of the plant for 12 months is in their hands. Since it has been approaching completion it has been visited and inspected by experts and practical men in the management of such plants. The universal verdict of all is that in completeness of detail, in perfection of arrangement and in economy of management there is no other Steel mill in the world to compare with it. It was calculated when it was commenced that the cost would be in the neighborhood of \$1,000,000. It has largely exceeded that, the entire cost approaching \$1,500,000, and it is said that it could not be built at the present time for less than \$2,500,000. The management some time since sold altogether in the neighborhood of 50,000 tons of Billets and Slabs, but of late have made no sales, nor are they seeking orders as yet. Their policy is to delay entering the market until things are running smoothly. So quotations cannot be given as yet.

The Alabama Consolidated Iron & Coal Company have now one furnace in operation at Ironaton, and anticipate that the Gadsden Furnace will be ready to light fires by the middle of December. At Brookwood the new coal mine they have opened will give them one of the best seams in the district and greatly increase their output. They will erect two new coal washers. Of the 300 coke ovens they were to erect, 35 are completed. The remainder will be finished as soon as possible. The question of a Coke supply sufficient to meet furnace wants is a specter that will haunt the dreams of furnacemen until the batteries contemplated are completed. Any failure in a daily shipment of Coke creates apprehension at the furnace, so dependent is it upon daily receipts.

Articles of incorporation have been filed by the Alabama & Georgia Mining Company. The company represent the interests of H. F. De Bardeleben and the Adlers. They are capitalized at \$300,000. Their name indicates their object. There can be no doubt now that the Bessemer Rolling Mill will be put in operation at as early a date as possible—say January. The difficulty and delay in obtaining material and needed machinery make it hard to estimate the time when any industry being built or renovated will be ready for operations. There are several enterprises mapped out whose projectors, because of these difficulties, are awaiting that more convenient season that is sometimes indefinitely postponed.

Hardie Fynes Company report new orders for four Corliss engines ranging from 400 to 100 horse-power. They also secured the contract for equipping the electric light plant at Thomaston, Ga., including boilers. They are so rushed on orders that their shops are never closed, night or day. The Means-Fulton Company have considerable furnace work in their shops—enough to carry them into the new year, and the Smelting Works have orders for

supplying Eastern furnaces with Tuyeres and other parts. If there is no improvement in the prospect ahead of us there is certainly not a single discouraging feature.

It can now be stated that the plans of improvement contemplated by the Republic Iron & Steel Company, here include an addition to the Steel plant at the rolling mills of four new furnaces, which would just double the present capacity. When this addition will be commenced circumstances will determine. Material and machinery from the Fort Payne plant are now being moved to the rolling mills and installed. Since their completion these mills have never enjoyed a season of greater prosperity than has prevailed under the present ownership.

There still prevails a good deal of prospecting and expert examination of mineral and coal lands. Large capital is looking for opportunity for investment, and opportunity is lying in wait for capital. Negotiations involving large amounts are on foot, but no deductions can be drawn or positive facts obtained until the papers are all signed.

New York.

Office of *The Iron Age*, 232-238 William street, }
NEW YORK, November 29, 1899. }

Pig Iron.—The market remains steady, the chief event during the week having been the purchase of about 6000 tons of Northern and Southern Pig Iron by a leading pump making concern for delivery during the first half of 1900. Prices are as follows: Lehigh and Schuylkill Irons, for 1900 delivery, No. 1 Foundry, \$25 to \$25.25; No. 2 X, \$23.75 to \$24; No. 2 Plain, \$22.25 to \$22.75, and Gray Forge, \$19.75 to \$20. Southern Brands are quoted: No. 1 Foundry, \$24 to \$24.50; No. 2 Foundry, \$22.25 to \$22.50; No. 1 Soft, \$22 to \$22.25; No. 2 Soft, \$21 to \$21.25; No. 3 Foundry, \$20.75 to \$21.50, and Gray Forge, \$20.25 to \$20.50.

Cast Iron Pipe.—No large contracts have been closed lately. The Brooklyn work is the most important in sight, it being estimated that the quantity required for the proposed improvements will range between 40,000 and 50,000 tons.

Steel Rails.—There are only moderate inquiries in the market and the Eastern Steel Rail makers continue to quote \$35 to \$37 for Standard Sections, at mill. Track Material is quoted 2.40c. to 2.50c. for Angle Bars and 2.65c. to 2.70c. for Spikes.

Finished Iron and Steel.—Some round contracts are pending and may be closed at an early date. Among the large affairs looming up is a second bridge across the East River, crossing at Blackwell's Island. Export business is confined to small lots. Plates have weakened further and are now more closely in line with the other leading rolling mill products. We quote: Beams, 2.40c. to 2.50c.; Angles, 2.40c. to 2.45c.; Universal Mill Plates, 2.65c. to 2.75c.; Tees, 2.40c. to 2.45c.; Channels, 2.40c. to 2.50c.; Steel Plates are 2.65c. to 2.75c. for Tank, 2.80c. to 2.90c. for Shell, 3.15c. to 3.25c. for Flange, 3.30c. to 3.40c. for Fire Box, 3.75c. to 4c. for Locomotive Fire Box, on dock. Charcoal Iron Plates are 3.10c. for C. H. No. 1, 3.60c. for Flange and 4.10c. for Fire Box. Refined Bars are 2.20c. to 2.25c. and Common Bars are 2c. to 2.10c., on dock. Soft Steel Bars, 2.50c. to 2.55c.; Hoops, 2.70c. to 2.75c., base, delivered.

Merchant Pipe.—Quotations on Merchant Pipe in carloads are 50, 10 and 10 per cent. discount, delivered, and in less than carloads 50 and 10 per cent., f.o.b. maker's mill. On Casing the figures are: For carload lots, S. and S. Joint, 37½ per cent.; Inserted Joint, 32½ per cent.; for less than carload lots, S. and S. Joint, 32½ per cent., and for Inserted Joint, 27½ per cent., less 5 per cent. to jobbers, the prices for carload lots being delivered and for less than carload lots f.o.b. mill. On Boiler Tubes, 1¼ to 2½ inch, the prices are 55 per cent. off on Steel and 50 per cent. on Iron; for Boiler Tubes, 2¼-inch and larger, 55 per cent. on Steel and 52½ per cent. on Iron, all subject to 5 per cent. on car lots, the prices for carload lots being delivered and on less than carload lots f.o.b. mill.

Metal Market.

Office of *The Iron Age*, 232-238 William street, }
NEW YORK, November 29, 1899. }

Pig Tin.—Very little business has been transacted in this market since our last writing. To-day the market was entirely featureless in its every phase, closing lower at 27.60c. to 27.80c. for spot, and 27c. to 27.20c. for futures. Although the London market fluctuated the deviations were not as marked as we have been in the habit of seeing lately. Transactions were on a decidedly reduced scale. The closing cables to-day came more than £1½ lower than last week's figures. Spot was quoted £126 7s. 6d., and futures £126 flat. Statistics for this month are due next week, and we predict that they will present a rather unfavorable spectacle.

Copper.—Is dull, and while the official quotation for

QUOTATIONS OF IRON STOCKS DURING THE WEEK ENDING NOVEMBER 29, 1899.

Cap'l Issued.		Sales.	Thursday.	Friday.	Saturday.	Monday.	Tuesday.	Wednesday.
\$29,000,000	Am. Car & Foundry, Common..	1,125	-16%	16% -17	.....	.....	16% -17	-17
29,000,000	Am. Car & Fy, Pref. (7% Non-Cu.)	1,670	.....	62 -62½	.....	-62	61½ -62	-62½
19,000,000	Am. Steel Hoop, Common.....	33,087	45 -45½	45½ -47	.....	47 -48½	47½ -48½	47½ -48
14,000,000	Am. Steel Hoop, Pref. (7% Cu.)..	4,970	82½ -83	83 -84½	.....	85 -85½	85½ -85½	85½ -85½
50,000,000	Am. S. & W., Common.....	28,425	48½ -49%	49½ -49½	.....	48½ -49%	49 -50	48½ -49%
40,000,000	Am. S. & W., Pref. (7% Cu.)....	1,025	.....	94½ -95	.....	95½ -95½	95 -95½	.....
28,000,000	Am. Tin Plate, Common, N. Y..	1,465	34½ -34½	.....	.....	34½ -34½	34½ -34½	34½ -34½
18,000,000	Am. Tin Plate, Pref., N. Y. (7% Cu.)	308	.....	.....	.....	-84	.....	-83½
7,500,000	Bethlehem Iron.....	200	.....	.....	.....	.....	.....	-59½
15,000,000	Beth. Steel, Par \$50, \$1 paid in.	235	.....	-19	.....	-19½	.....	-19½
7,974,550	Cambria Iron, Phila*.....	103	-44½	.....	.....	-44½	.....	-44½
16,000,000	Cambria Steel**.....	7,771	20 -20½	20½ -21½	.....	20½ -21½	20½ -21½	20½ -21½
11,000,000	Col. Fuel and Iron.....	5,390	-52½	52 -53	.....	52½ -52½	52½ -53	52½ -53
46,484,300	Federal Steel, Common.....	131,947	58½ -59½	59 -60%	.....	59½ -62	61½ -62½	61½ -62½
53,253,500	Federal Steel, Pref. (6% Non-Cu.)	13,463	80½ -81	80½ -81½	.....	81½ -82½	81½ -82½	82 -82½
32,000,000	National Steel, Common, N. Y..	3,880	47½ -48½	48½ -48½	.....	48 -48½	48 -49	48½ -48½
27,000,000	Nat'l Steel, Pref., N. Y. (7% Cu.)	2,730	-95½	95 -95½	.....	.....	94½ -95½	95 -95½
5,000,000	Penna., Common, Phila.....	1,939	75 -80	81½ -82	.....	83 -84	83½ -83½	83 -85
1,500,000	Penna., Pref., Phila.....	212	-80	.....	.....	-90	-89	-91
12,500,000	Pressed Steel, Common.....	3,355	.....	57½ -59	.....	59 -59½	59 -59½	-59
12,500,000	Pressed Steel, Pref. (7% Non-Cu.)	875	89½ -89½	-89½	.....	89½ -89½	.....	.....
27,352,000	Republic Iron & Steel, Common.	10,388	24½ -25	24½ -24½	.....	25 -25½	25½ -26½	26 -26½
20,852,000	Repub. Iron & Steel, Pref. (7% Cu.)	3,530	-70	69½ -70	.....	70½ -71	71 -71½	71½ -71½
20,600,000	Tennessee Coal and Iron.....	7,020	113½ -114½	115 -115½	.....	115 -116½	-116	-115
1,500,000	Warwick Iron & Steel (par \$10)	2,679	-10½	10½ -10½	.....	-10½	9½ -10½	-10

* Par \$50. ** \$1.50 per share paid in. + 8% guaranteed by Beth. Steel Co. Late Philadelphia sales by telegraph.

Bonded indebtedness: Am. S. & W., \$130,656; Am. Tin Plate, none; Am. Steel Hoop, none; Cambria Iron Co., \$2,000,000 6% debenture 30-year bonds, 1917, payable option 5 years, assumed by Cambria Steel Co.; Federal Steel Co., \$13,200,000 Illinois 5%, \$7,417,000 E. J. E. R. R. 5%, \$1,000,000 Johnson 6%, \$6,732,000 D. & I. R. R. 5%, \$1,000,000 2d D. & I. R. R. 6%, \$10,000 land grant D. & I. R. R. 5%; National Steel, \$2,561,000 6%; Tennessee C. & I. R. R. Co., \$8,367,000 6%, \$1,114,000 7%, \$1,000,000 7% cu. pref.; Pennsylvania Steel, \$1,000,000 5% Steelton 1st 1917, \$2,000,000 5% Sparrow's Point 1st 1922, \$4,000,000 consolidated, both plants; Bethlehem Iron, \$1,351,000 5% maturing 1907. Interest and principal guaranteed by Bethlehem Steel Co. Republic Iron & Steel, none; Warwick Iron & Steel, none. Colorado Fuel & Iron Co.: Col. Fuel Co. Gen. Mort. 6% \$880,000, Col. Coal & Iron Co. Mort. 6% \$2,810,000, Col. Fuel & Iron Gen. Mort. 5% \$2,303,000. Also outstanding \$2,000,000 preferred stock with accumulated dividends of \$640,000 to June 30, 1899.

Lake is still 17c. to 17½c., the metal can be purchased freely at 17c. from first hands. The market is nominal as transactions are few and far between and of a very slight nature at that. No one is even bidding 17c. for any fair sized quantity. Electrolytic and casting, while still 16½c. to 17c., are said to be subject to concessions. The London market is extremely quiet, the discount between spot and future being fully £2. At the close to-day the quotations were £75 for spot and £73 for three months' futures. Best Selected is £79 5s., which is 10s. higher than last week.

Pig Lead.—Spot, New York, is firm and is commanding at least 4.65c. Metal on the spot is very scarce, and we understand that several very large consumers have been caught with but a few days' supply on hand. The American Smelting & Refining Company have about 30,000 tons en route in shipment. The price quoted by this company for shipments is 4.60c., New York. St. Louis is quoted by the company 4.50c. Futures are quoted here 4.60c. by private parties who also quote St. Louis 4.47½c. to 4.50c., with a firm market. London is unchanged at £17 10s.

Spelter — Is very weak, spot selling at 4.45c., while shipments sold as low as 4.35c. There were sales in St. Louis at 4.15c., and London has broken through the £20 mark and fallen to £19 17s. 6d. The Ore market is demoralized. There were sales of high grade Ores reported at \$30, but we have heard from excellent sources that sales have actually been made at \$25 per ton. And this is 60 per cent. Ore.

Antimony.—Is unchanged. Cookson's is quoted 10½c. to 11c., and Hallett's 9½c.

Nickel.—Is firm and unchanged with prices ranging from 40c. to 45c., according to quantity and delivery.

Tin Plates.—There is no change. The prices quoted by the American Tin Plate Company are on a basis of \$4.84 per box of 100-lb. Cokes, New York delivery.

Iron and Industrial Stocks.

The leaders during the week in activity among the steel stocks have been the Federal Steel, American Steel Hoop and Republic stocks. Officers of the first named talk of the early payment of dividends on the common. The Steel Hoop continues to make records for earnings, while Republic is now reported to be getting into higher priced contracts fast. Tin Plate, too, is reported to be earning well on its current production. On American Steel & Wire a Chicago dispatch reports earnings aggregating \$4,892,048 for the first six months, with a very much better rate in recent months.

In Philadelphia, Pennsylvania Steel has shown a heavy advance on light sales, and Cambria has gained somewhat.

	Bid.	Asked.
International Silver, Common.....	12	14
Otis Elevator, Common.....	28	30
Otis Elevator, Preferred.....	92	94
H. R. Worthington, Preferred.....	109	110

Cramp's Shipyard Stock.....	68	78
Pratt & Whitney, Common.....	3½	5
Pratt & Whitney, Preferred.....	50	54
E. W. Bliss, Common.....	132	...
E. W. Bliss, Preferred.....	125	...
U. S. Projectile.....	95	100
Barney & Smith Car, Common.....	21	25
Barney & Smith Car, Preferred.....	94	100
International Pump, Common.....	17½	19
International Pump, Preferred.....	67	68½
Diamond State Steel.....	57½	6
Tidewater Steel.....	15¼	15½
Sloss & Sheffield Steel & Iron, Common.....	36	37
Sloss & Sheffield Steel & Iron, Preferred.....	74	76
National Tube, Subscriptions, Common.....	46	46½
National Tube, Subscriptions, Preferred.....	94	96
American Bicycle Company, Common.....	20	22
American Bicycle Company, Preferred.....	55	60
American Bicycle Company, Bonds.....	90	92

The Republic Iron & Steel Company have declared the second quarterly dividend of 1½ per cent. on their preferred stock, payable January 1. Books close December 15 and reopen January 2.

Coupons due December 1 on the 6 per cent. gold mortgage bonds of the International Silver Company will be paid by the transfer agents, Thomas & Post, 71 Broadway, New York.

Tennessee Coal, Iron & Railroad Company announce that the coupons due December 1 on the bonds of the Cahaba Coal Mining Company will be paid at the Hanover National Bank.

The Cambria Steel Company announce that they are prepared to purchase bonds and scrip of the Cambria Iron Company from January 2 to February 1, 1900, at 106½. This is the issue of 1897 of \$2,000,000 6 per cent. bonds, callable at par on or after July 1, 1902. The Cambria Steel Company are therefore anticipating by two and a half years.

The Central Trust Company of New York are now prepared to deliver engraved certificates of Sloss-Sheffield preferred and common stocks, upon presentation of the trust company's interim certificates for the same.

The October earnings of the Tennessee Coal, Iron & Railroad Company were \$262,297, as compared with \$67,420 last year. From January 1 the figures are \$1,275,394 and \$639,322 respectively.

The American Tin Plate Company are said to be earning 7 per cent. on the preferred and 30 per cent. on the common stock, and yet the common has recently sold as low as 32. At the December meeting it is said the directors will set aside a fund to guarantee dividends on the preferred stock for three or five years.

It is reported that the preferred stock of the United States Cast Iron Pipe Company has been offered recently at 55.

Currency has been given to reports that the American Steel Hoop Company proposed to anticipate the payment of the two quarters' dividend on preferred stock on the current fiscal year, with the purpose of beginning payments of dividends on the common stock. We are officially advised that there is absolutely no truth in these reports. At the end of the fiscal year the directors will consider the question, although it may be stated that past and current earnings warrant placing the common stock on a dividend basis.

The Belgian Iron Market.

BRUSSELS, November 17, 1899.—My last correspondence appeared in *The Iron Age* of October 5. Much to my regret I was not able to send a letter in the meantime, having been forced to go to Russia in behalf of an industrial undertaking of the first importance.

The following table shows how prices compare to day with those ruling on September 15 and those prevailing on November 15, 1898, all the figures being given for metric tons:

	Nov 15, 1898.	Sept. 15, 1899.	Nov. 15, 1899.
No. 3 Luxemburg Foundry Iron.....	110.00	110.00	56.00
Luxemburg Mill Iron.....	85.00	85.00	52.00
Charleroi Mill Iron.....	90.00	90.00	56.00
Thomas Pig.....	100.00	100.00	65.00
No. 2 Bars, f.o.b. Belgian stations.....	210.00	190.00	132.50
No. 3 Bars, f.o.b. Belgian stations.....	215.00	195.00	137.50
No. 2 Bars, f.o.b. Antwerp.....	200.00	185.00	125.00
No. 3 Bars, f.o.b. Antwerp.....	205.00	190.00	130.00
No. 2 Beams, Iron or Steel, at mill.....	205.00	185.00	132.50
No. 2 Beams, Iron or Steel, f.o.b. Antwerp.....	190.00	182.50	127.50
Angles, f.o.b. Belgian stations.....	220.00	200.00	135.00
No. 2 Iron Plates, f.o.b. Antwerp.....	225.00	215.00	145.00
No. 3 Iron Plates, f.o.b. Antwerp.....	240.00	225.00	150.00
Homogeneous Iron Plates, f.o.b. Antwerp.....	260.00	250.00	170.00
No. 2 Plates, f.o.b. Belgian stations.....	225.00	215.00	150.00
No. 3 Plates, f.o.b. Belgian stations.....	240.00	225.00	160.00
Homogeneous Iron Plates, f.o.b. Belgian stations.....	260.00	250.00	200.00
Steel Plates, f.o.b. Belgian stations.....	240.00	230.00	160.00
Sheets, f.o.b. Belgian stations.....	250.00	240.00	170.00
Steel Plates, f.o.b. Antwerp.....	240.00	230.00	155.00
Steel Rails, f.o.b. Antwerp.....	160.00	160.00	110.00

The figures show that in two months, with the exception of Rails, the products of finished Iron and Steel have advanced from 10 to 20 francs per ton, and I may add that the rise has apparently not exhausted itself and that at this writing the question is being seriously discussed whether to advance No. 2 Bars to 225 francs per ton and No. 3 Bars to 230 francs per ton. This therefore would represent a rise in one year of 100 francs per ton, which is enormous. I know personally of business closed yesterday at the Brussels Exchange at 220 francs for home market and 210 francs for export. Some uneasiness is developing about these rapid advances, not alone because they might adversely influence our exports but because they might make it impossible for our shops to compete even in Belgium, and to greater extent abroad, against their competitors in England, Germany and the United States. The rolling mills, however, argue that they are forced to sell at high prices because wages have advanced considerably and raw materials, Coal, Pig Iron, Scrap, Blooms and Billets have largely gone up. This unfortunately is only too true. Since spring rolling mill fuel has advanced 7 francs per ton.

So far as Pig Iron is concerned it should be noted that generally speaking rolling mills bought for the entire year 1900 at prices considerably below those now quoted. The result is that present prices are largely nominal and that they do not apply except to small lots for immediate delivery. The large lines were closed at 15 to 20 francs less.

It is a fact, however, that nothing could be bought to-day below the figures given in the above table. Coal, Coke and Pig Iron are extremely scarce in Belgium at the present time, and we are more and more forced to depend upon foreign producers, particularly in England, who supply us more than ever before.

Prices on Furnace Coke are 29 to 30 francs per ton, while Coal is hard to procure for Screenings at less than 13¼ francs, while 17, 18 and 19 francs are paid for Heating Coals. These prices apply to pit mouth, to which a maximum freight of 2½ francs must be added for the haul from colliery to mill.

So far as our production of Pig Iron is concerned it has never been as great as it is at the present time. Thus far we have been ahead of the best year—1897—to the extent of 200,000 tons, which indicates a total production for the current year of 1,225,000 tons. In spite of this our requirements are such that imports are constantly increasing. For the first ten months of the current year they were 300,465 tons, against 265,680 tons in 1898.

Billets and Blooms remain exceedingly scarce. Prices are now 165 to 170 francs per ton for Blooms and 180 for Billets. The import duty for Belgium is 4 francs per ton for Blooms and 6 francs per ton for Billets, while the cost of transportation from Antwerp to the mills averages 4.55.

Our exports, which are made chiefly through the intermediary of English firms, have suffered somewhat from the rise in exchange and the advance in freight due to the Transvaal war. The home consumption fortunately is very heavy and more than compensates for the loss of export trade.

All our construction shops, Bolt works, Nail works, &c., are overloaded with orders, particularly for the French Government and for the large French railroads. Generally the conviction is held in Germany that our present prosperity is assured not alone for the entire year 1900 but for at least the first half of 1901.

The New York Machinery Market.

Office of *The Iron Age*, 232-238 William street, New York, November 29, 1899.

Business was just a little slow during the last week. That is, of course, in comparison with what it has been all through the summer, when the demand was so great as to congest every shop represented in New York. That a time should come which would allow the manufacturers to catch up is but natural. New York machinery merchants are hoping that this is the time. They are being brought to task by their customers so often on account of the inability of the manufacturers to deliver that it is becoming irksome. One representative of a high class line put it in this wise: "There are several good customers of mine in this district whom I am actually ashamed to visit on account of the treatment which I was compelled to give them through the impossibility of obtaining tools from the manufacturers who promised them months ago." For some weeks past the dealers in this city have not gone after business very hard, for they were not only unable to promise reasonable delivery in answer to the inquiries that come in to them, but could not induce their concerns to ship the goods which they had long since promised. Some of the large firms exercised enough foresight to order considerably in advance of the immediate business in sight. These concerns have had the advantage of the market, as they were not only accumulating a comfortable stock to meet the demand on the spot, but in many instances were the sole gainers as the result of increased prices. It is said that certain shops were pretty well tied up by selling agents.

Regarding the present condition the opinion is held by some that the general quiet which usually precedes and accompanies the holiday season is at hand. The belief is also expressed that owing to distant deliveries and high prices prospective purchasers are holding off in anticipation of an easier condition of affairs for next spring.

We are informed that there was a considerable amount of American machinery lost with the wrecked Hamburg-American liner "Patria." Several of the largest machine tool builders in this country are said to have had large consignments aboard. An interesting point is raised in this connection. Many of the tools lost are of very heavy types and consequently they were ordered some time ago. Since their ordering prices have advanced considerably. In some instances the tools, we are told, were insured at their actual cost and not at the price which would be required to replace them. The American builder is safe on this matter, as in almost every instance the goods were sold f.o.b. steamer and the consignee attended to the insurance. To duplicate the orders the purchasers will have to pay advanced rates. Schuchardt & Schütte, we understand, had almost \$50,000 worth of machinery on the steamer, but we are unable to ascertain whether the insurance covered the prices which would be demanded for duplicate machines or simply the actual price paid for the tools. In times such as these a mishap such as this is most unfortunate.

We are advised that another advance of about 10 per cent. has been made on Cahall water tube boilers.

Leather belt manufacturers are stiffening in prices. A new list has been issued by Charles H. Schieren & Co. showing an advance of about 15 per cent. Other manufacturers are changing constantly and have notified the trade that prices are liable to change at any time without prior notice.

The J. A. Fay & Egan Company have advanced prices on their wood working machinery about 5 per cent.

Sibley & Ware of South Bend, Ind., have advanced about 10 per cent. on their price list.

A location has been decided upon for the erection of the plant of the Gruson Iron Works. The new plant will be erected at Eddystone, near Chester, Pa. It will be recalled that this company are to build the Gruson chilled cast iron rotating turret, which is used for coast defense. At present an iron foundry, machine shop and power plant will be built. Within a year this plant will be increased materially. The main plant is in fact not to be erected until a year from this time. David Townsend, who is in charge of the company's Philadelphia office, 1013 Betz Building, will purchase the material required for the building of the plant. The company will also make heavy iron castings for the trade.

A machine shop equipment is being purchased by the Whitman Mfg. Company. This company were recently incorporated in New Jersey and they are arranging for the erection of a plant at Garwood, N. J., where they will build tools and special machinery. The principal devices which they will manufacture are pipe wrenches and the Ball & Corbett gas engine clutch. The New York office of the company is at 39 and 41 Cortlandt street. The officers of the company are: William H. Corbett, president; Allen E. Whitman, vice president and manager, and Bert C. Ball, secretary and treasurer. It will be noticed that both members of the firm of Ball & Corbett are interested in the new company. The firm of Ball & Corbett, con

sulting engineers, will, however, be continued independently just as heretofore.

The equipment of machinery and tools for the new plant which the New York Air Compressor Company of 120 Liberty street will erect at Arlington has been ordered chiefly through the Prentiss Tool & Supply Company and Manning, Maxwell & Moore.

The International Pneumatic Tool Company of London, who purchased the English rights for manufacturing under the patents of the Standard Pneumatic Tool Company of Chicago and New York, are preparing for the erection of a new plant. Two engineers have been sent to England by the Standard Company to aid in this work. The plant will, of course, be built much on the lines of the shops of the American company, and consequently the equipment will be principally American. Much of the machinery will be purchased through Charles Churchill & Co. This company will also purchase a good portion of the equipment for the new plant of the British Westinghouse Works, which will be erected at Manchester. This equipment, it is expected, will soon be ordered, and the bulk of it will easily be purchased in this country. We understand that the Niles Bement-Pond Company have already submitted bids on a large portion of the machinery. It is said that during his recent trip to this country Mr. Churchill secured specifications and prices of certain tools for both of these plants. O. H. Baldwin, managing director of the British Westinghouse Company, is now in this country.

We are informed that the specifications for the machinery to be installed in the projected new plant of the Fuller Round Bale Cotton Compress Company will not be issued until early next year. This company anticipate the erection of extensive works, and will purchase a machinery equipment which will cost something like \$100,000. The plant is projected for Memphis, Tenn.

The New York office of Bement, Miles & Co. has been discontinued. The office was formerly located at 39 and 41 Cortlandt street. The company's New York business is now being conducted at the offices of the Niles Bement-Pond Company, 136 Liberty street.

The awarding of the contracts for building the six unprotected cruisers of 3200 tons each will increase the activity of the shipyards in this section. One of the firms who received a contract for one of these boats ordered a large locomotive crane several days ago. The order contained the proviso, "if we are awarded a contract." They received the order, and consequently the crane company were also benefited. Owing to the present activity of all shipyards many orders will doubtless be placed by the fortunate bidders for additional equipment to their plants. There was a little comment occasioned over the fact that Townsend & Downey failed to land one of the cruisers. The especial interest centered in this concern was over the fact that had they been successful work would have been pushed vigorously toward the completion of a plant on Shooter's Island, N. J. Townsend & Downey have an option on the island, and it is thought that they have been holding back their shipbuilding project pending the recent awards. Their option expires in December, and we understand that even though they should withdraw their project, another company, backed by a strong financial syndicate, will take the matter up immediately. It looks very much, in fact, as though a shipbuilding plant will soon be erected on Shooter's Island by one of these concerns.

E. Ruckdeschel and Ernst Meyer of the firm of Ernst Fr. Weisslag of Gera, Germany, have been in this country purchasing machinery for the equipment of a weaving plant which will be erected at Passaic, N. J., as a branch of the company's German mills. A site has been purchased at Passaic, and plans for the construction of the plant are complete. The power transmission machinery has been purchased from the A. & F. Brown Company of Elizabethport and the Havemeyer Building.

An order for a centrifugal pumping plant, to be installed at the works of the Ohio Steel Company, has been awarded to H. E. Maxfield, 39 and 41 Cortlandt street, New York representatives of the Lawrence Machine Company of Lawrence, Mass. The plant will have a capacity of 16,000 gallons per minute.

The Metropolitan Railway Carriage & Wagon Company of London have ordered from Westinghouse, Church, Kerr & Co. three 225 horse-power Westinghouse gas engines. The latter company also received from the Riter-Conley Mfg. Company of Pittsburgh an order for four gas engines aggregating 500 horse power.

The contracts for the entire equipment of elevating, conveying and power transmission machinery for the Buckhorn Portland Cement Company of Manheim, W. Va., and the Virginia Portland Cement Company of Craigsville, Va., were awarded to the Webster Mfg. Company of Chicago and 42 Dey street.

Contracts for mechanical appurtenances to the International Bank Building, which is now being erected on the northwest corner of Broadway and Cedar street, have been let. Francis Bros. & Jellett, Inc., of 70 Trinity

place were awarded the contract for the heating, ventilating and steam fittings. The Payne Engine Company of 120 Liberty street received the engine order, and the boilers were ordered from the Gearv Water Tube Boiler Works of 39 and 41 Cortlandt street.

It is said that H. E. Hotchkiss, who is manager of the machinery showrooms of Adolphe Janssens, Paris, is in this country attending to the purchase of machinery. He is said to be stopping at the Hotel Imperial.

Among other recent arrivals in this country are W. J. P. Moore, British representative of the Worthington branch of the International Steam Pump Company, and J. W. Downer, British representative of the National Tube Works.

The Cincinnati Machinery Market.

Office of *The Iron Age*, Pickering Building, {
CINCINNATI, OHIO, November 25, 1899. }

The newest feature in the mechanical expansion which is taking place in this smoky old place, and one which is destined to be a prominent factor in the future development of the machine tool industry, is the opening of the new shops of the Fosdick & Holloway Machine Tool Company on Blue Rock street, Cumminsville, this city. This company have been in existence for quite a term of years, but hitherto they have operated their shops under contract with the American Tool Works Company and their predecessors. Now, however, they have formally launched themselves under new conditions and will hereafter market their output under their own name plate. They have always made a specialty of radial drills and will continue in the same exclusive line, with, however, an entire new equipment in the way of patterns. The new shops are situated very conveniently for shipping their output, being within a few hundred feet of the C. H. & D. R.R. The new buildings consist of a lofty one-story brick and iron shop 80 x 300 feet and a roomy structure containing lavatory for the hands and engine and boiler rooms. The shop is heated by hot air system installed by Bayley & Sons, Milwaukee. The power is furnished by a Mcllvain & Spiegel boiler and Lane & Bodley 12 x 36 Corliss engine. The electric light plant is one of the most complete ever put into operation in this city. The light is generated by a Jantz & Leist 125-volt machine, which is driven by a small 8 x 8 engine. The shop is furnished with two hand power traveling cranes. It is not yet fully fitted up with all the tools required, but these will be put in as soon as they are received from the makers. Among the new tools already belted up are a 43 x 48 planer from the Cincinnati Planer Company's shops and a Gleason automatic gear planer, which is regarded as a marvel of mechanical perfection. The north end of the shop is designed for the receiving of all castings and supplies, and as the work of finishing progresses the parts are moved toward the south end, where they are assembled and shipped. The energy of the works will be confined exclusively to the production of radial drills ranging in size from 2½ to 5 feet. At present they are working 75 men and turning out 30 to 35 finished tools per month. They are starting with sufficient orders on the books to keep them running for six months. New orders, about equally distributed between foreign and domestic, are coming in at a very satisfactory rate.

The J. A. Fay & Egan Company make the most enthusiastic report this month that they have been able to do in the past year. They make the statement that their export trade for the current year will show up to be five times greater than that of any other year in their experience. The domestic trade also shows a good increase and at this time promises excellent results in the near future. Some months ago they took up the new branch of furnishing band saw mill outfits and this has grown so rapidly that they have had to erect a building on the corner of Central avenue and Front street especially for the use of this department. This new building is one story, with 5000 square feet of floor space. G. P. Altenberg, who has been traveling throughout Europe in the company's interest for the past eight months, has just arrived at home after a very successful trip. Quite a good trade has been opened up in the Orient and some excellent contracts have been recently placed for the Trans Siberian Railroad in Manchuria. F. A. Horne, who is the company's representative in China and Japan, is at present in this city conferring with the home office in regard to far Eastern prospects. Several good orders have recently been placed from Manila for saw mill machinery. A statement which recently appeared in a trade journal crediting another shop with the first shipment to Porto Rico is combated by the Fay & Egan Company, who claim to have dispatched over two carloads to that island several months ago and before the order mentioned was even booked. One of the nicest contracts recently taken is the complete equipment of a large piano factory which is just being fitted up in one of the suburbs of this city.

The Bullock Mfg. Company, Norwood, Cincinnati, report the following representative orders which have recently been placed on their books: For the United States Playing Card Company, who are building a very large plant near the Bullock shops, they are making two generators, one 250 and one 150-kilowatt; also two 150-kilowatt generators for the Manchester *Sporting Chronicle*, Manchester, England; an order from Denver for two 50, two 40, one 30 and two 10 horse power motors and one 150-kilowatt generator; for the *North American*, Philadelphia, two 100-kilowatt generators and three 50 horse-power teaser equipments. A 100-kilowatt generator weighs about 12,000 pounds and a 150-kilowatt weighs 15,000 pounds. One of the largest generators recently ordered is an 800-kilowatt for the Oakland Transit Company, Oakland, Cal. Also three 800 horse power alternating current motors for the Wilson Aluminum Company, Holcomb Rock, W. Va., these to be used in the manufacture of ferrochrome and calcium carbide. A notable foreign order came recently from the *Novoe Vremya*, a daily paper at St. Petersburg, Russia, to be used in driving a large Hoe press. The company have recently established an agency in Moscow and also made connections in Calcutta and Bombay.

The I. & E. Greenwald Company have had a very good trade recently. They do almost no direct exporting and do not make any effort for foreign business. They report one of the best seasons they have ever had and say that the demand they are having for gears is a sign that others are also finding trade excellent. The call for gears comes from all over the United States and is remarkably well distributed among the different branches of manufacture in which they usually find their patrons. In their shops they are now turning out two 14-foot gears of $5\frac{1}{4}$ pitch to be sent to Ottawa, Canada, for use in water works construction at that point. A nice feature of recent business is the number of orders for their automatic engines which they have very recently booked for delivery to Cincinnati customers. Among these are the following: One 20 x 48 300 horse-power engine for Haberer & Co., manufacturers of carriage wood work, who were burned out some months ago and who are now building and fitting up anew; one 14 x 33 100 horse-power engine for the Eureka Soap Works; one 16 x 42 150 horse-power engine for the Boss Washing Machine Company's new plant at Norwood; one 14 x 36 100 horse-power engine for the Bradford Mill Company; also one 70 horse-power 12 x 36 engine for the Blymyer Mfg. Company, and one 100 horse power engine for the Triumph Electric Company to be sent out with an ice machine plant about to be shipped by that company. They are also making a cast iron mill husk for Fleischman & Co.'s new distillery on the Hudson River. Quite recently they have purchased a new 60-inch lathe with 12-foot bed and are now setting it on its foundations in their main shop.

The Haven Malleable Castings Company are a new corporation with a capital stock of \$75,000. They are the successors to the old firm of Jas. L. Haven & Co. Having recently purchased a 4 acre lot on the corner of the C., H. & D. R. R. and Dane street, Cumminsville, Cincinnati, they are preparing to erect a model plant for the purpose of making malleable castings and elevators, both of which branches were operated by their predecessors for many years. The company are officered as follows: W. A. Haven, president and general manager; Jas. L. Haven, vice-president, and W. J. Schumacher, secretary and treasurer. Bids are now being taken for the construction of the buildings and the expectation is that they will be ready for occupancy by April 1 next. The foundry is to be a one story structure 18 feet in the clear and 100 x 230 feet in dimensions. The annealing and cleaner building is to be of one 18-foot story, 60 x 200 feet in size. The machinshop will be two stories, 60 x 135 feet. The furnace building will adjoin the foundry and will be 40 x 100 feet. The company will start with a full order book and will give employment to 250 men.

J. M. Robinson & Co., who make sheet metal working machinery, report a good call for their heaviest machines and with but few discouraging features to detract from a very successful season. Among their recent orders we find the following: One for a heavy corrugating and roofing machine for South America, one large bending machine for Milwaukee, one of the same type for bending 8 to 10 gauge iron for Ashtabula, Ohio; one for a local customer, one for the university, Notre Dame, Ind., and also one for the New York Trade School. All of these are largest sizes. They have just completed the shipment of six heavy bending machines for a company in Chicago.

Among the concerns who seem to be always building, expanding and progressing is the Cincinnati Milling Machine Company. They are now at work upon the new buildings which were mentioned as proposed in *The Iron Age* a few months ago. In addition to what was outlined at that time they have decided to make some improvements having in view the increased comfort of their men. An additional story is being added to their office building on Cook street, which is to be utilized in this manner.

When completed this building will contain, in addition to a very fine suite of rooms for office purposes, bathroom, reading room and dining room, with kitchen attached. All these for the accommodation of the hands. The management will endeavor to furnish a good substantial menu in the restaurant at the lowest cost possible. The shops even in their present condition constitute the largest plant in this section used exclusively for the manufacture of one specialty. When the additions are completed it will lead all competitors by a long gap. One of the especially large orders lately taken is for a large number of milling machines for the new plant of the Deutsches Niles Werkzeug Fabrik at Berlin.

The Davis Sewing Machine Company of Dayton, Ohio, who in the recent past operated a force of 80 hands, have within the past year increased their capacity to 300 hands and are now making preparations for still further expansion to the number of 500 hands. The plant is to be increased proportionately in size.

The Boston Machinery Market.

Office of *The Iron Age*, 33 Mason Building, {
BOSTON, November 27, 1899. }

Under the same high pressure which has characterized this and other markets for months, the dealers in machinery and tools continue to fill orders as rapidly as possible, but find the demand outstripping them, and their facilities taxed to the utmost all the time. One feature, however, is brought to the front by the higher level of prices, which is considered worth noting by dealers when summing up the situation—namely, the check that is imposed upon State and municipal governments by the rise in values. Available appropriations as a rule cannot very well be increased materially over those of preceding years, and undertakings that would have been carried out with former conditions prevailing are now postponed for a season if they do not come under the head of emergency work. This applies to pumping machinery for water works, for instance, and to structural iron and steel in particular, as well as to many other branches of the iron industry that are directly or indirectly affected by this lack of sufficient funds. Municipal building projects are held in abeyance for a while, and the installation of heating plants, power and light appliances, hoisting apparatus and other adjuncts of modern city and town buildings is affected. For the present, however, mercantile and manufacturing enterprises are sufficiently active to more than offset whatever loss in business is traceable to this cause, and nobody seems to be suffering from anything more serious than a surplus of demand for iron and steel products of every sort.

An event that happened Saturday will probably bring the Navy Department into the market for some machinery and tools in the near future. Fire broke out shortly before 8 o'clock in the ship fitters' shop at the Charlestown Navy Yard, which contains some of the most valuable machinery in the entire plant, and it is estimated that it will require an outlay of perhaps \$35,000 to replace and restore the equipment to proper condition. If much of the damaged machinery is taken out and supplanted by new the cost will be more than this estimate, in all probability.

A topic for considerable comment was furnished bridge building concerns in this section within a short time by the Boston & Maine Railroad Company. After putting out calls for proposals on material for a bridge on the line in the vicinity of Springfield, Mass., the railroad officials decided to build a wooden bridge instead of a steel one. This looked like a step backward to most of the bidders, and rather surprised them, especially as it was understood that the question of difference in cost was a vital point in the matter. They had supposed that modern conditions were such that wooden bridges were fast becoming a thing of the past, regardless of cost, and there was something in the nature of a shock to them in this phase of the case. To *The Iron Age* correspondent, however, the situation was explained by the railroad's representative as follows: "The bridge for which bids were sought was over a roadway 34 feet in all, with two spans each 17 feet in length. In round numbers the price for the steel simply delivered to us, at destination, on the cars, would have been at the average bid, say \$4500. Then it would have cost perhaps \$750 additional for construction, ties, &c. The bridge was to carry six tracks. The cost for a wooden bridge, strong and serviceable, will be far less than this figure. We have by no means abandoned the use of wood for such purposes,

and it is really nothing unusual for this road to utilize lumber for some pretty good sized bridges, even on the latest additions to the line. We have recently built a wooden three-span bridge, 400 feet long, in northern Vermont, and another 100 feet long. We are constructing at the present time, on a branch road approaching completion near Manchester, N. H., a Howe truss bridge with 125 feet clear span. We build both wooden and steel bridges, according to circumstances, but wooden ones are certainly no innovation, nor can the recent example be considered a return to former custom, inasmuch as we had never departed entirely from that style of construction."

The city's bridge to Charlestown, the most modern of all the structures spanning the river from Boston to suburban sections, was formally declared completed and open for traffic to-day. There are five electric motors in the engine room of the 1200-ton draw, two of them being used to swing the draw on its 70 wheels and the other three for auxiliary purposes in connection with a compressed air and petroleum arrangement for lowering or raising the structure. The Boston Elevated Railway tracks will cross this bridge, and the superstructure therefor is already in position.

Chandler & Farquhar report a lively demand for small tools, as well as for general machinery. Boston capitalists interested in South American development enterprises have been good purchasers lately for equipment of this description to be shipped to the Southern continent. This firm installed the first lot of machinery during the past week in one of three automobile plants, for which they have the contract to furnish a large part of the outfits. They also shipped within a few days a couple of carloads of heavy machinery to the Seattle Electric Company of Seattle, Wash.

Hoisting and handling machinery, portable engines and kindred appliances are in excellent demand. J. H. Houghton reports a call for engines especially that makes it impossible to forward them without unavoidable delay, the manufacturers being compelled to work day and evening to keep within hailing distance of their orders. At times during the past six or eight weeks there has been a tendency, he says, to put a rosier hue on current conditions in the Eastern market than the facts warranted, in the daily press, the Western demand being taken as a basis for general reports, the Eastern section included. Nevertheless, an excellent business is in progress, and cannot be complained of, even if it does not bear out the extreme assertions that are sometimes set in circulation.

A glance around the salesrooms of Hill, Clarke & Co. impresses the observer with the fact that machine stocks are depleted in a marked degree. There are gaps in the warerooms where formerly in duller times machines stood waiting the inspection of customers. "Say the situation is unchanged," said Mr. Clarke, Sr., when interrogated regarding trade conditions. "I don't know what else you can do. There is no special order or contract of note to announce, but general demand is all that could be wished for."

Running evenings until 9 p.m. since October 1 is the status at the works of the Chapman Valve Mfg. Company, and this will continue for some time to come, it is expected.

At the Boston office of the Niles Tool Works a big volume of business is reported, with inquiries coming along this month at a rate which compares favorably with previous periods of the year.

An increase of storehouse capacity to double its former proportions to meet the requirements of his business has been secured by Henry F. Hill. Recent transactions have called him often to Providence, R. I., where he finds the machine shops and other industrial plants exceedingly active. A new automobile company have secured the former quarters of the Corliss Safe Works in that city, and will fit up the buildings for the manufacture of vehicles. The Builders Iron Foundry of Providence will remove a very large planer from their plant, to enable them to devote more room to their gun work. Ex-President Angell of the American Screw Company, with ex-Superintendent Rogers and the latter's son, have leased the buildings of the old Diamond Machine Company, and are equipping them as rapidly as possible for a screw manufacturing plant. The machinery is of a special type principally, and most of it is built by the Waterbury Farrel Foundry & Machine Company of Waterbury, Conn.

From Portland, Maine, comes the information that Magquier & Jones are branching out more fully into structural iron work, and have added to their plant and machine equipment. Hilles & Jones Company of Wilmington, Del., have placed a big double angle iron shear in this establishment recently.

The salesroom of the American Wood Working Machine Company at 94 Pearl street is to be given up, and they will have only an office in this city hereafter, ma-

chines being shipped direct from the manufacturers. For the present the new location is in abeyance, as they have a lease of the premises they have been occupying. The work of clearing out machines is nearly completed, however, and the office will be leased to new tenants if possible. An excellent trade throughout the year is Manager Moore's summary of the business situation. Lumber mills have been quite well supplied with work for a number of months, and the call for machinery in all lines has kept pace therewith. Among recent installations were 50 machines at Portland, Maine, and the Berlin mills outfit. Boston wood working plants have been in the market lately, and have added freely to their machinery.

The Walworth Mfg. Company are making plans to remove shortly to the new city salesrooms fitting up for them at 130 to 136 Federal street.

Frederick B. Slocum, the former manager of the Henry R. Worthington Company, has been given the Michigan State agency of the Ashton Valve Company of Boston, Mass. Mr. Slocum has opened an office at room 69, Newberry Building, and his extensive acquaintance among the engineers and steam users throughout the State of Michigan ought to give Mr. Slocum a good start in the pop safety valve and gauge business.

MANUFACTURING.

Iron and Steel.

We are advised by Chas. Miller of Miller & Sibley, Franklin, Pa., that the construction of a steel casting plant at Franklin is contemplated. A meeting of those interested in the new venture is to be held in Franklin during this week. While the organization is not completed, it is believed that it will materialize in due time.

The Lisbon works of the American Tin Plate Company, at Lisbon, Ohio, were closed down last week.

Arthur J. O'Leary, 132 and 134 West Lake street, Chicago, has purchased the Phoenix Chain Works, adjoining him on the west, and will add the manufacture of heavy chains to his other products. The chain department has been equipped with a new testing machine and an air compressor. The forging department is crowded with work of all kinds, and promises to continue so, good orders having been received from outside points as well as Chicago. The machine shop has been equipped with additional tools to keep up with the pressure on its facilities.

The Illinois Steel Company have recently completed a new finishing end for their small trains at the Milwaukee works, and have a new machine shop at the same works well under way.

The Falk Company, Milwaukee, Wis., originators of the cast welded rail joint and builders of complete electric railways, switches, frogs, &c., are building a steel foundry for the manufacture of steel castings. It will be equipped with the Wellman-Seaver Company's tilting open hearth furnace and will have a daily capacity of 30 tons. They expect to have this part of their works in operation by January 15. They are also building large machine shops, blacksmith shops and a power house, involving in all an expenditure of considerably over \$100,000.

The Carter Steel & Iron Company have been organized at Knoxville, Tenn., with a capital stock of \$600,000 and the privilege of increasing it to \$5,000,000. The new company have absorbed the Blue Springs Mining Company, the Helen Maud Iron Company, the Stoney Creek Iron Company and secured valuable iron mines in Carter County, Tenn.

The Portland Rolling Mills Company, Portland, Me., whose plant was recently destroyed by fire, have decided not to rebuild.

J. H. Hardebeck, an Illinois promoter, proposes the erection at Lockport, N. Y., of a plant consisting of two blast furnaces, open hearth and Bessemer steel departments, and a rolling mill. The company, entitled the Lockport Iron & Steel Company, are to have a capital of \$5,500,000. C. G. Sutliff, Charles E. Dickinson and E. J. Taylor of Lockport, N. Y., are interested.

We are officially advised that the report that the American Steel Hoop Company would build a fourth blast furnace at the Isabella group at Etna, Pa., is untrue. The three present stacks there are to be enlarged and remodeled and the capacity very much increased.

The Columbus Iron & Steel Company have been incorporated by H. A. Marting and others, with a capital stock of \$400,000, to build a blast furnace in Columbus, with a capacity of 300 tons of pig iron per day. It will be recalled that Colonel Marting recently bought two furnaces at Ironton, and out of these two he will build a new stack at Columbus.

The Sharon Steel Company, who will erect a basic open hearth plant at Sharon, Pa., have given a contract to the Baldwin Locomotive Works, Philadelphia, for two standard gauge shifting engines.

The Cherry Valley Iron Works, at Leetonia, Ohio, have filed a suit against the Leetonia Forging Company to collect \$28,835.52, alleged to be due for labor, material and money.

Last week a land patent was issued to the Carbon Steel Com-

pany of Pittsburgh for a tract of four acres of land on the Allegheny River. It is estimated to be worth \$120,000. The tract extends about 400 feet along the river front and part of the electric buildings of the plant, carpenter shop and sheds are located on it. The Pittsburgh Junction Railroad runs through a part of the property. Extensive improvements are now being made at the plant of the Carbon Steel Company, who will increase their capacity from 75,000 to 100,000 tons. New electric cranes are being installed, which are displacing old hydraulic cranes, and the open hearth furnaces are being increased in capacity. These improvements and additions to equipment have been made absolutely necessary by reason of the fact that with their present capacity the concern are unable to fill their orders. The Carbon Steel Company make acid open hearth steel only, the product consisting of boiler and fire box steel for railways and Government work and universal plates. This concern have made all the boiler and protective decks and hull plates for the United States ships "Olympia," "Iowa," "Oregon," "Minneapolis" and "Brooklyn." The general offices of the company are in New York and most of the officials and directors live there. Chas. N. Raymond of New York is president, and E. J. Brennan of New York secretary and treasurer. J. W. Anderson of Pittsburgh is general manager and also a director.

Machinery.

The Berlin Machine Works, Beloit, Wis., are adding considerably to their already large plant. They are building an extension to their main building which will be 300 feet long, are installing a 600 horse-power cross compound condensing Corliss engine, and are increasing their boiler equipment.

The Beloit Iron Works, Beloit, Wis., have secured a \$60,000 contract from China, for building two paper making machines of the most modern type.

The Stickney Gas Engine Company, St. Paul, Minn., have decided to make their own castings and have accordingly contracted for the erection of a foundry on Stryker avenue, West St. Paul.

The plant proposed to be built by the Grand Rapids Malleable Iron Company, at Grand Rapids, Mich., is of large capacity. It will comprise five foundries, each having its own furnace, and the annealing department will contain eighteen ovens. Some new features are to be introduced, which are claimed to be exclusively controlled by this company.

The Globe Machinery & Supply Company, Des Moines, Iowa, have equipped a large machine shop with an outfit of the latest improved machinery and tools for the purpose of conducting a general jobbing trade.

The Stockham Mfg. Company, Forty-sixth street and Grand avenue, Chicago, are building an additional foundry and machine shop, 100 x 130 feet in size, to meet the increasing pressure on their facilities. They will make malleable as well as gray iron castings.

The Logan Mfg. Company, producing steel and iron castings, recently acquired for \$85,000 a tract of land in the borough of Phoenixville, Pa. Upon this property is to be erected a large plant. The main foundry building is now approaching completion, and work is being pushed upon it as well as upon foundations for machinery, furnaces, &c., and the installation of machinery has begun. It is hoped by the last of December to be in a position to take orders.

J. B. Doan & Co. of Chicago have just been awarded the contract for the machine tool equipment for the United States refrigerating and ice making plant now being erected in Manila, P. I. The outfit consists of lathes, shapers, drills, &c., of the latest improved design.

The Pittsburgh Locomotive Works, Allegheny, Pa., are full of orders and running their plant to full capacity in all departments. Recently they secured contracts to build ten engines for the Cleveland, Lorain & Wheeling Railroad; eight for the Duluth, Missabe & Northern Railway, and two for the Monongahela River Railway.

The Cleveland Ball & Screw Company of Cleveland, Ohio, have enlarged their works, so that now they have about three times the floor space of last spring, with a capacity of over 1,000,000 balls of $\frac{1}{2}$ inch diameter and upward per day. The concern have recently added six new polishing machines of their own make and are building six more. The plant is being operated to its full capacity.

The Pennsylvania Railroad are installing in their shops at Altoona, Pa., a very large riveting machine, which will have a pressure of 125 pounds to the square inch.

The Union Boiler Cleaner Company of Pittsburgh have been granted a charter of incorporation with a nominal capital of \$1000. The directors are A. T. Rowand, Jr., Robert Russell and Jos. C. Biley, all of Pittsburgh. The new concern will take over the present business and interests of the Union Boiler Tube Cleaner Company of Pittsburgh.

The Union Switch & Signal Company of Pittsburgh, with works at Swissvale, Pa., will erect a large addition to their plant. The works of the National Switch & Signal Company, at Easton, Pa., recently purchased, have been dismantled and the machinery will be removed and set up in the new plant, which will besides contain considerable new machinery. Plans have been prepared for the addition and active work will soon be

commenced. There will be three connected iron and steel structures covering an area of 400 x 300 feet. The buildings will contain iron and brass foundries.

The contract for the electrical machinery and appliances for the new basic open hearth steel plant for the Sharon Steel Company, at Sharon, Pa., has been awarded to the Siemens-Halske Electrical Company of Chicago. Included in the equipment are two generators of 600 horse-power each.

The Clyde Steamship Company have placed the contract with the Berlin Iron Bridge Company of East Berlin, Conn., for a new pier shed and dock at Providence, R. I. The building will be 40 feet wide and 600 feet long.

OBITUARY.

GEORGE W. B. TAYLOR.

George W. B. Taylor, one of the members of the firm of N. & G. Taylor Company, tin plate manufacturers, of Philadelphia, died suddenly of heart disease early Sunday morning at the Hotel Walton. A short time ago Mr. Taylor returned from his summer home at Edgewater Park and had since been living at the Walton. For more than a year he had been troubled with heart disease. Mr. Taylor was 49 years old. He was born in Philadelphia. His father, George E. Taylor, who died in 1882, was also at that time a member of the present firm. He had been associated with the firm for 30 years.

NICHOLAS K. WADE.

Nicholas K. Wade died at his home in Santa Barbara, Cal., on November 13, aged 76 years. He was a native of Pittsburgh, Pa., and for many years was a member of the firm who operated the Fort Pitt Iron Works in that city.

Higher Freights on Ore and Coke.—PITTSBURGH November 29, 1899.—(By telegraph.)—The Western Pennsylvania and Eastern Ohio Freight Association met in Pittsburgh on Tuesday, November 28, and agreed on an advance in coke and ore freights, to take effect January 1. The present coke rate from Connellsville region to Pittsburgh is 55 cents and this will be advanced to 70 cents, while from the Connellsville region to the Valleys the present rate is \$1.20, and this will be advanced to \$1.35, both rates taking effect January 1, and will include the terminal charges. It is also likely the ore rate will be advanced, but the definite figures have not yet been agreed upon.

Information Wanted.—Who produces wood splitting machines (for stove and kindling wood)?

A correspondent wishes to know where he can purchase a plant for the manufacture of tar turpentine, creosote and wood alcohol from the fir and pine tree.

The 1000 steel cars ordered from the Pressed Steel Car Company by the Philadelphia & Reading Railroad will be of a new style. They will be high side gondolas with drop bottom; length, 34 feet; width, 8 feet 4 inches; 70,000 pounds capacity. The special equipment includes chilled cast iron wheels, Fox trucks, Westinghouse brakes, Schoen brake beams, Gould M. C. B. couplers, Gould spring buffer, P. & R. journal bearings, $4\frac{1}{2}$ x 8 inches. The 22 coaches ordered by the Philadelphia & Reading from the Harlan & Hollingsworth Company are divided as follows: Ten 72-foot coaches, two 72-foot combination cars and ten 52 foot coaches. The seating capacity of each is 86 people. The special equipment includes Boies 36-inch wheels, P. & R. trucks, Westinghouse brakes, Gould couplers, Standard Steel Company's steel platform, M. C. B. $4\frac{1}{2}$ x 8 inch journal bearing, Bushnell seats, safety car heating and lighting system, double coil Baker heater, Gould vestibules and mahogany finish, with oak head linings.

The proposed combination of scrap iron dealers is understood to have been abandoned. The project to consolidate all the concerns in the scrap business has been on foot for some time, but insuperable difficulties were met with in consummating the deal.

During the last three months the demand for crude rubber has been so vigorous that prices have been advanced about 15 per cent. While the activity of electrical works occasions a good portion of the demand the output of general rubber goods in this country has been tremendous of late.

Charles Forsman, formerly of the Sharon Works of the National Steel Company, at Sharon, Pa., has gone to Chihuahua, Mexico, where he will take charge of the open hearth steel plant of the Mexican Industrial Company at that place.

HARDWARE.

Condition of Trade.

THE demand for seasonable and holiday goods, which are in active request, coupled with what is doing in other lines, makes a large volume of business between wholesale and retail merchants. Trade is thus very satisfactory, orders being generally distributed for the various classes of goods in such a way as indicates the good condition of things throughout the country. Jobbers on their part are not buying at all freely at present except in some lines of seasonable goods, on which contracts are being made, if not already placed, for next year's requirements. Their policy is rather to dispose of the stocks on hand before placing further orders. The wisdom of this course is generally recognized, and many retail merchants are pursuing a similar policy and are careful to avoid an accumulation of stocks, the value of which if carried long must ultimately be less than at present. The movement of goods in the stores of both jobbers and retailers is undoubtedly large. The extent to which it is wise for the merchant in either branch of the trade to adhere closely to selling prices based on the advanced cost of the goods is a question which must be determined by each merchant for himself. There is little doubt that many retailers are giving their customers the benefit of low costs and refraining from advancing selling prices with the advances which have taken place in the market. A similar course is to a certain extent being followed by the jobbers, with whom there is a disposition to shade prices more freely than a short time ago. Where goods have advanced from 50 to 100 per cent. or more, the temptation to do this is very great. The near approach of the first of the year, with its usual task of stock taking, is having its effect on the market. The question as to the prices at which stock should be valued is one which will call for the exercise of the best judgment of merchants. There will be a temptation to put goods down at prices which, if the market should soon turn, may not be realized, and the fictitious profits thus indicated in the inventory fail to materialize. A conservative course in this matter is undoubtedly the wisest. The open changes in the market this week are not many or important, but there still continues an upward movement in many goods which have not heretofore advanced to any great extent; but it is to be noted that in some lines which lie near the raw material the tone of the market is not quite so strong.

Chicago.

(By Telegraph.)

The volume of business in Shelf Hardware is not only larger than usual at this season but is much in excess of that of the corresponding time last year. It will be remembered that last year's late fall business was regarded as exceptionally good, therefore this year's trade is particularly satisfactory. The demand is heavy for all kinds of staple articles, including the general line of store goods, and building materials, including Builders' Hardware and related merchandise. The orders for such

goods are not in quantities for stock, but are of a size indicating that merchants are purchasing only for their current wants. The fact that such purchases are swelling the trade to large proportions speaks well for the general condition of the country. The open weather causes a continued good demand for Roofing Materials, Galvanized Sheets and Building Supplies generally. Jobbers are looking for further advances in prices at the beginning of the new year, as in sundry lines the full advance on raw material has not yet been given its proper consideration by manufacturers. Good orders are steadily being booked for future delivery on such articles as Wire Cloth, Steel Goods and other merchandise which will be in most active demand for the spring trade. The month of November has been the biggest month ever known in the Heavy Hardware trade. Jobbers' stocks are being continually drawn upon by large consumers. It has been impossible for jobbers to accumulate stock in their warehouses, and assortments are therefore still badly broken.

St. Louis

(By Telegraph.)

A big demand is seen for Poultry Netting. Galvanized Iron is reported by some jobbers to be selling quite freely at a lower price to-day than mills will quote for delivery after January. There has been no stiffening in price in either Black or Galvanized Sheets, however. The business of this week is characterized by an unusually strong movement for small Shelf Hardware, and the numerous individual shipments show wants to be widespread. Holiday goods are in fine sale, but the lack of sharp winter weather has held back sales of Skates, Sleds and kindred goods. House Heating Apparatus is also in slower movement from same cause. Builders' Hardware is selling splendidly beyond the time quietness ordinarily begins. Sash Weights, which were short here, are now in somewhat better supply. Shot Guns, Rifles, Ammunition and Sporting Accessories are in good demand, but it is not possible to ship game to distant points on account of warm weather. A few advances have been made, including 10 per cent. on Hatchets and 5 per cent. on Hammers and Sledges. Differential Pulley Blocks have advanced 10 and 5 per cent. Railway and Garden Wheelbarrows were marked up \$1 per dozen. Medium grade Lawn Mowers, also Agricultural Wrenches, are up 10 per cent. Rumor has it that Farming Tools will show higher figures shortly. Business is in excellent shape, and November trade is reported by some jobbers as the largest of the year, judging by the way goods have gone out. The Interstate Commerce Commission at its session in St. Louis conducted some inquiries of interest to all concerns shipping to the coast, but particularly interesting was the testimony of Hardwaremen who ably protested against the differential in carload and less than carload rates.

Notes on Prices.

Wire Nails.—No change has taken place in the condition of the Wire Nail market during the past week. Demand continues moderate to cover immediate requirements. Manufacturers' quotations are as follows, f.o.b. Pittsburgh, terms 30 days net:

To jobbers in carload lots.....	\$2.95
To " in less than carload lots.....	2.97½
To retailers in carload lots.....	3.10
To " in less than carload lots.....	3.20

Concessions from above prices are often made by parties who have stock purchased at lower figures.

New York.—Stocks of low priced Wire Nails still remain in some jobbers' hands, but are gradually diminishing. Enough remain, however, to cause some irregularity in the market. For quantities less than carloads the following quotations are shaded in some instances:

To retailers, carloads on dock.....	\$3.25 to \$3.28
To " less than carloads on dock.....	\$3.30 to 3.41
Small lots from store.....	3.35 to 3.45

Chicago, by Telegraph.—Manufacturers report a diminished inclination by large buyers to place orders. This is a condition of trade to be expected with inventory season so near at hand. It is therefore not a condition which causes any apprehension for the future, as a revival in the demand is expected as soon as inventories have been taken and preparations become in order for the spring trade. The manufacturers hold prices firmly on the basis of \$3.28 Chicago for single carload orders. Jobbers report a remarkably good demand from stock, which is exceeding their expectations for the season. They continue to quote \$3.38 for small lots from stock.

St. Louis, by Telegraph.—The volume of sale is unusually large. No change in prices has taken place, which continue \$3.33, base, St. Louis, for single carloads, and \$3.43 for small lots.

Pittsburgh.—There is only a fair demand, and nearly altogether for small lots. There continues to be some unevenness in prices of Nails among jobbers. We quote:

To jobbers in carload lots.....	\$2.95
To " in less than carload lots.....	2.97½
To retailers in carload lots.....	3.10
To " in less than carload lots.....	3.20

Cut Nails.—The irregularity in the Cut Nail market alluded to in our report last week continues. The price obtainable by jobbers is \$2.40 to \$2.45, with freight from Pittsburgh to point of destination added, while the nominal base price is \$2.60 at Pittsburgh, with freight added. Demand is comparatively light, and stocks purchased at lower prices are also a disturbing influence in the market.

New York.—The discordant conditions which aggravated the weakness of the local Cut Nail market last week appear to have been eliminated. While prices are not quotably higher, the market has a stronger tone. Single carloads are quoted at \$2.65 on dock; small lots from store at \$2.75. For the smaller quantity the price is frequently shaded from 5 to 10 cents per keg.

Chicago, by Telegraph.—The consumption has shown a marked increase of late, the volume of business in this line now being the largest in five years, but of course much below that in Wire Nails. No change has been made in prices, jobbers continuing to quote \$2.80 for small lots from stock.

St. Louis, by Telegraph.—Trade in Iron Cut Nails is, without question, on the increase. Prices continue to range from \$2.75 to \$2.90, base.

Pittsburgh.—Demand for Cut Nails is only moderate, and the tone of the market is not as strong as it has been. While it is true that Cut Nails are being offered by certain mills on the base of \$2.40 Pittsburgh, yet we have authentic advices that Wheeling mills are adhering firmly to \$2.50 base in carloads, f.o.b. at mill, Wheeling, and \$2.60 in less than carloads, usual terms.

Barb Wire.—Prices of Barb Wire remain unchanged and demand for home consumption is light. Quotations for domestic trade are as follows, f.o.b. Pittsburgh, net cash 30 days:

To jobbers in carload lots, Painted.....	\$3.40
" " Galvanized.....	3.55
" in less than carload lots, Painted.....	3.42½
" " Galvanized.....	3.57½
To retailers in carload lots, Painted.....	3.55
" " Galvanized.....	3.70
" in less than carload lots, Painted.....	3.65
" " Galvanized.....	3.80

Chicago, by Telegraph.—The American Steel & Wire Company have begun to rebuild the Waukegan works with the intention of restoring the plant to its previous capacity with such improvements as are made desirable by the progress of the trade since it was originally built. The demand for Plain Wire and Barb Fencing from factory is less active on account of the approach of the end

of the year, when manufacturing consumers and jobbers desire to have their stocks as light as possible. This will afford the mills a little breathing spell and will give them an opportunity to make needed repairs and get in shape for the very heavy business which is expected preparatory to the opening of the spring trade. Manufacturers are looking for an enormous business in Fencing at that time. Jobbers are surprised and pleased at the continuance of the good demand for Barb Wire Fencing owing to the exceptionally open weather which is running later than usual this year. Prices continue as follows: Single carloads, Plain Annealed Wire, \$3.13; Painted Barb Wire, \$3.73; Galvanized Barb Wire, \$3.88, with 10 cents advance by jobbers for small lots.

St. Louis, by Telegraph.—The week has shown no serious selling movement, but considering the dull season sales were satisfactory. Prices continue \$3.78, St. Louis, for single cars of Painted and \$3.88 for small lots, with 15 cents advance for Galvanized.

Pittsburgh.—There is very little domestic trade in Barb Wire, but export demand is large. For domestic trade we quote Barb Wire at \$3.40 for Painted in carload lots to jobbers, with an advance of 15 cents for Galvanized, all f.o.b. Pittsburgh; terms, 30 days net cash.

Smooth Wire.—The demand for Smooth Wire continues unabated. The market continues firm at former quotations as follows, f.o.b. Pittsburgh, terms 30 days net cash:

To jobbers in carload lots.....	\$3.80
To " in less than carload lots.....	2.82½
To retailers in carload lots.....	2.95
To " in less than carload lots.....	3.05

Pittsburgh.—There is a fairly good demand and prices are strong, the only unevenness existing being among jobbers who bought when the market was much lower. We quote: To jobbers in carload lots, \$2.80; to jobbers in less than carload lots, \$2.82½; to retailers in carload lots, \$2.95; to retailers in less than carload lots, \$3.05, all f.o.b. Pittsburgh; terms, net 30 days. The charge for galvanizing is 50 cents on sizes from Nos. 6 to 14, inclusive; on Nos. 15 and 16, 85 cents, and on Nos. 17 and 18, \$1.10.

Cordage.—No change has taken place in the price of Manila or Sisal Rope since the advance of Manila on November 8, which brought it to a base price of 15½ cents per pound for 7 16 inch and larger for small lots. Sisal remains at 10½ cents on the same basis for similar lots. Purchasers are ordering sparingly in view of the future uncertainty of the market, as with the termination of the Philippine hostilities the price of Manila Hemp is likely to fall off, and Sisal Hemp will probably rule lower in sympathy with Manila. The high prices of Manila and Sisal Rope have brought Jute Cordage into more prominence. Jute Rope is quoted, for any quantity, at 7 cents per pound for No. 1, ¼ inch and up, and 6½ cents for No. 2, ¼ inch and up. Some jobbers with cheaper stocks in hand are accepting orders for small lots down to 6¼ cents for No. 1. The present crop of Jute is referred to as light, and lower prices for Jute products are not anticipated for the next six months. Quotations for Rope in less than carload lots are as follows, with a reduction of ¼ cent per pound for carloads, f.o.b. New York, Boston or Philadelphia:

	Per pound. Cents.
Manila, 7-16 inch and larger.....	15½
" ¼ inch.....	15
" ½ and 5-16 inch.....	16½
Sisal, 7-16 inch and larger.....	10½
" ¼ inch.....	11
" ½ and 5-16 inch.....	11½
" Lath Yarn, Medium and Coarse.....	10

Manila Tarred Rope, 15 thread, is quoted at 15½ cents, as is also Manila Hay Rope, Medium.

Glass.—The committee who were appointed to complete and arrange the details for the formation of a National Window Glass Jobbers' Association are working toward this end, with the probability of success. It is proposed to have an Eastern and Western division, with headquarters at New York for the Eastern and at Chicago for the Western. These will work independently as to

local conditions, and in harmony on all questions affecting the trade at large. The association will work in harmony with both the American Window Glass Company and the independent factories so long as they can realize a profit by so doing. Among the objects of the association, as stated last week, is to prevent an open market, to regulate manufacturers' prices, to purchase in large quantities as an association so as to obtain all the concessions possible in price, and to correct trade abuses. It is not their present intention to make a large advance in price to retailers, but simply enough to cover the expenses of maintaining the association. The association is to include the hundred or more recognized Window Glass jobbers of the country. There are about 500 pots in operation, but from present indications a general resumption of Glass factories will not take place before January 1, 1900, which would put new Glass in the market about February 1. Glass is being sold in small lots by jobbers at 80 and 10 to 80 and 20 per cent. discount, the extreme figures only being reached in exceptional cases. As Glass becomes more scarce prices will naturally stiffen. The American Window Glass Company's quotations are as follows:

Districts.	A.	B.	C.	F.
5000 boxes or more.....	85	85	.....	85
Carloads.....	80 & 15	80 & 15	80 & 20	80 & 15
3000 boxes or more.....	80 & 20	80 & 20	.....	80 & 2½
1000 boxes or more.....	.....	.....	85	.....

Prices subject to freight allowance.

Paints and Colors.—Leads.—The manufacturers of White Lead in Oil have reaffirmed present card prices, but have extended the time deliveries to January 31, 1900. Manufacturers are unwilling to consider inquiries for delivery for next year, owing to the probability of higher prices prevailing later. The market is firm at former quotations, as follows: In lots of less than 500 pounds, 6½ cents; in lots of 500 pounds and over, 6 cents.

Oils.—Linseed Oil.—On November 23 Linseed Oil manufacturers advanced the price to 46 to 47 cents per gallon for City Raw, according to quantity, and on the 27th a further advance was made to 48 to 49 cents per gallon, according to quantity. All city brands are now quoted at the same price. State and Western Oils are held about 1 cent below the prices of the 27th. The Linseed Oil situation is a puzzling one even for those conversant with the Oil market for the past 10 or 15 years. Flaxseed is high and scarce notwithstanding an estimated large crop. What part of the crop has been shipped to market or how large a proportion of it has been taken on speculative account is difficult to determine. But a small proportion of the amount of Seed exported in former years has gone abroad this fall, and the present price has put a stop to exportation. It is surmised that 50 cents per gallon for City Raw in lots of five barrels or more, is the figure which manufacturers have set for Oil to reach. Whether the market can be sustained at present or higher prices next year is problematical.

Spirits Turpentine.—A declining market brought large consumers into the market the last part of last week. Liberal purchases put a stop to the downward course of prices and gave a firmer tone to the market, with an upward tendency in values. Present quotations are as follows: Southern, 52 cents per gallon; machine made barrels, 52½ cents per gallon.

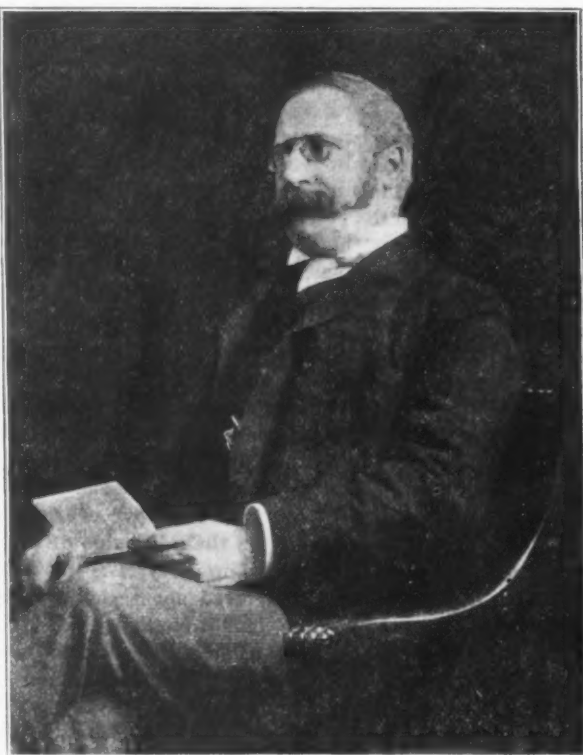
THE SIMONDS MFG. COMPANY, Fitchburg, Mass., makers of Saws and Machine Knives, in sending us a printed circular representing Robert Chatwin and his helper, who have used the Simonds Saws in Australia during the champion sawing contests, draw attention to the popularity of these meetings. Thousands of people attend them, and some from a great distance. The contests are held annually, those especially referred to being held in Tasmania. Robert Chatwin is referred to as the champion of the Antipodes, having won the title in three successive annual contests.

Grout & Jewett, Shelby, Mo., have succeeded C. V. Clay. The firm are building a new warehouse.

T. H. Newman.

A PORTRAIT is herewith given of T. H. Newman, the recently elected president of the Canadian Wholesale Hardware Association. As a result of the efforts of several of the largest firms in the Dominion, who recognized the desirability of forming a Canadian jobbers' association, to be conducted on about the same lines as the National Hardware Association of the United States, this association was organized at a meeting held January 10 last, the leading jobbers of Ontario and Quebec becoming members. William Vallance of Wood-Vallance Company, Hamilton, Ont., was the first president, filling the position with marked ability until the annual meeting, which was held in Hamilton on September 14 and 15. Mr. Newman was then chosen president for the ensuing year.

One of the objects of the association is to promote good will between the jobbers and manufacturers. At-



T. H. NEWMAN.

tention has also been given to the correction of numerous abuses which have crept into the trade, and we are advised that a great deal has been accomplished by the association since it began its work.

The new president of the association was born in Toronto, Ont., in 1851, the family removing to Montreal, Que., in 1860. Six years later Mr. Newman entered the employ of Crathern & Caverhill as general utility boy. As a result of hard work, based on a determination to master the details of the business, he steadily rose in the confidence of his employers, and the value of his services increased with each succeeding year. The outcome was not surprising. In 1884, when the firm of Caverhill, Learmont & Co. were organized to carry on the growing Shelf Hardware business of Crathern & Caverhill, Mr. Newman was rewarded with a partnership. The house have since added Heavy Hardware to their line, and with fifteen men on the road do a very extensive business throughout the Dominion, from the Atlantic to the Pacific.

Mr. Newman's business qualifications are of a high order, and with fine executive ability he combines unflagging energy and a strong personality. His disposition is quiet and unobtrusive, and his evident sincerity and kindness have gained for him a host of friends both in Canada and the United States. During the recent convention of the National Hardware Association at Pittsburgh Mr. Newman was present as the representative of the Canadian organization.

The Effect of High Prices on the Demand for Goods.

The following additional letters from representative retail Hardware merchants reflect the views of the trade on the question as to the extent to which the high prices prevailing interfere with the sale of goods. They are of special value as indicating without bias the opinions and experience of merchants in direct contact with the consumers. Many other subjects of interest to the trade are also touched upon by our correspondents:

MINNESOTA.

It appears to us that trade is going on in the usual way; in fact, there appears to be as much, if not more, building now than there has been for some years. We hardly think the trade will keep up for next year, on account of the high prices.

CONNECTICUT.

In our line the heaviest advances are in Nails, Wire, Bolts and Coach Screws. Nails go to builders; they find fault, of course; Wire Fence to farmers and they have reason to find fault, so that our Wire Fencing trade is of no account this fall. Bolts and Coach Screws go to our manufacturers, and when they find fault we call their attention to their own advances. Although in the writer's opinion Builders' Hardware, as manufactured here (except Screws), has not yet been advanced in proportion to the advance in the cost of material, the situation is one that will puzzle larger brains than ours. It is almost impossible to get goods promptly in many lines, and we are told that the output of iron furnaces was never so large as this year, so that the scarcity is not from restriction in the production of raw material, but from a large increase in consumption. One good sign is the scarcity of labor. It is hard to find common laborers here to dig ditches, &c., and so long as labor is employed they will spend money and have what they want, even at higher prices. A manufacturer said to the writer within a few days that he could use 40 more molders than he now has if he could get them. This scarcity of labor is one of the best signs we see, and so long as our nation and a few on the other side of the water keep up wars and destroy property it seems as though the demand for manufactured goods the whole world over will continue for some time to come. It seems to us, however, that the people who control the iron and steel production should be content with a good margin of profit. They should be reasonable and not force prices too high now, for the time will come when a few can not control the situation as they do to-day.

NEW YORK.

Up to the present time the high prices have not interfered with or retarded building. Most of the work which is being done was contemplated and laid out before the great increases of prices. The increases of prices have been so rapid that the effect has been to cause people to purchase quickly before any further increase, but from now on they are going slowly.

The rapid increase in the price of lumber will have much more to do with retarding the building trade than the increase in the prices of Hardware and iron goods.

Any further advance in prices will be disastrous. I think that the limit has been reached in most lines.

I purchased quite heavily in many lines when prices were low.

I am now purchasing from hand to mouth, as the saying goes, for such articles as I am short on, which articles are not many, and I am working off at the high prices all that I can sell.

In some lines I am offering goods at the same price at which they can be purchased in New York City.

I shall not do any building at present. There have been a good many empty houses here, but during the last six months they have been filling up.

People are all busy. Our foundries are all at work, and when people have work they are not so apt to halt upon a price, but when they think that the limit of price has been reached they are not in a hurry to purchase,

and that of itself will be apt to cause a halt in prices.

There is, of course, some protest against the high prices, but there is always some complaint about prices, no matter what they are.

My judgment is that the present prices can be

maintained until the manufacturers begin to produce more than is required.

MICHIGAN.

The beginning of high prices was largely anticipated by merchants, and the constant energy of traveling salesmen cautioning dealers to lay in stock resulted in much extra buying and the laying in of a surplus of goods. The retailer, always anxious to sell cheaper than his neighbor, kept prices down. They, having purchased before the lively increase of values, were prepared to sell without proper watchfulness of daily advances, and as a consequence consumers have not really paid the real advance price for their supplies to date. As an instance of trade in one commodity, in April No. 12 Galvanized Wire was retailed here at \$2.25 to \$2.50 per 100 pounds, which at that time was below jobbers' prices in small lots. At the present time there is no stock in the hands of the retail trade, no one buying now in consequence of the high price. At the present time No. 12 Galvanized Fence Wire would have to be sold for \$3.90 to \$4 per 100. This seems to be a prohibitive price and certainly a curtailment of use will follow. Wheat and many farm products remain exceedingly low, and farmers are wondering how to keep pace with the times. From now on the higher prices that will prevail are sure to be more noticeable, and we shall look for more complaints than any that have been manifest in the last six months, and the quantity consumption cannot be kept up. Let us have a fair price for all; no one will complain, but greed cannot control the world for any great length of time.

NEW JERSEY.

I do not think that the heavy advances in goods have caused much objection on the part of buyers and they have not interfered with their sale. I think buyers are prepared to pay the advance and do so cheerfully. In my opinion the higher prices have stimulated trade. I do hope that prices will not be advanced too much or go too high, for if they go too high there will be a reaction, and then no one knows where prices will go to.

MARYLAND.

Objection is constantly made to the high prices by our customers—principally farmers. They want to know the reason why, and at once commence a tirade upon trusts, predicting all sort of terrible calamity for the country, and round up by expressing a desire to have a chance to vote for some one regardless of politics who will "thrash out" the trusts. It interferes to an appreciable extent with the sale of certain goods. One farmer, an intelligent man, within the last month said: "The price of Wire is prohibitive. I shall go home and put the hands to work and make rail fence." Another man said: "I had intended to build this fall, but the price of lumber, Nails, Glass, &c., has reached such a figure that I have deferred it." We feel justified in saying that the heavy advance has cut our output in the last four months 25 per cent.

MISSOURI.

The prices have affected the Barb Wire trade fully one-third, being that much less than last year. Also Nails in the same degree. Buggies and Wagons have been affected very much lately. Grain and hay are very low here.

MICHIGAN.

The marked advances during the past six months in Wire Nails and other staple goods we believe have

curtailed the volume of business to some extent. We have more or less complaint at these radical advances extending over such a short period of time. And customers do not easily understand that the increased cost of goods results from the much larger consumption and scarcity of goods.

We find, however, from day to day less complaint as the consumer is better informed as to the reason for the higher cost of goods, and in comparison with lumber and other lines Wire and Nails are not out of proportion in price.

MASSACHUSETTS.

While there is quite a little complaint regarding the higher prices on our line of goods, there is still a feeling of content and confidence that better times are upon us.

At the same time it is only based on the hope that wages will be advanced and plenty of work furnished the employees at advanced prices, and if such hope is realized we feel quite sure that everything will be all right.

MISSISSIPPI.

My opinion is that it will reduce the amount of goods sold, at least 25 to 35 per cent.

The consumers in my locality are mostly farmers, and they are not receiving any advance on their product in proportion to goods sold them, therefore they are buying smaller quantities.

For instance, take Barbed Wire and Nails. A man will need 1000 pounds, but when informed the price is $4\frac{1}{4}$ cents per pound, where he has been paying 2 to $2\frac{1}{4}$ cents, he will cut his order to half the amount, and often go without any, as he has not the means to buy at the advanced price what he needs.

As to Shelf Hardware, Stoves and Tinware, there has been no advance, as most of the retailers were stocked up and have not advanced their prices and will not until they have to buy again.

In other words, I do not expect to handle by a third as many goods the coming year as I did the past year, on account of the advanced prices. A farmer will repair his old implements and make them do a while longer, or do without many things that he would buy if prices were lower.

This is the situation in my locality, where I have had 33 years' experience.

PENNSYLVANIA.

In items where the advance has been so exceedingly great as in the item of Shovels, Nails, &c., it certainly does retard sales. This perhaps is more perceptible in Shovels and articles where the consumer is not always compelled to buy, having the option to get along with the old. I think my experience shows a falling off in the sale of Wire Nails since the last advance.

Upon the whole, in my opinion, a conservative advance would not retard sales at the time, but the very radical advance certainly does.

NEBRASKA.

The increased prices on goods meet with disfavor from the consumers, and the objections are numerous and furious, for we are situated in a strictly agricultural district where wheat is the principal crop, and the price of that commodity is extremely low. As to the decrease in the volume of sales I cannot say, for the reason that two houses that sold our class of goods have gone out of business at this point during this year. The volume of business done by our house is about what it has been for the two seasons last past.

MICHIGAN.

We think the retail dealers generally have not advanced their goods in the same proportion that the manufacturers have, because their trade would not stand it. It is easy enough to mark goods up but you cannot oblige people to buy. The past few years are evidence of how people can economize on consumption if they choose, and in our opinion when the time comes, as it must very soon,

when people have to pay the dealer his legitimate advance on the prices the manufacturers are asking for goods then the consumer will cut down his wants.

There is no doubt but goods were too low and a reasonable advance would have met with no opposition, but at the pace manufacturers are advancing their goods they are inviting disaster in the near future.

MINNESOTA.

We think the high prices have caused a great many to postpone purchases indefinitely. Our sales are really no larger than last year in money amount, showing less goods have been sold.

ARKANSAS.

If cotton would go higher there would be no kicks in this county. We can pay good prices for goods when we can get anything for cotton.

MINNESOTA.

The heavy advances on Hardware have very materially affected our business this fall.

A great many farmers who were going to do a large amount of fencing this fall refuse to pay the advance and will do without the new fence.

A customer came into our store a few days ago to buy a Spade. We showed him one that we used to sell at 75 cents but that we could not sell at present for less than \$1.

He objected to the advance. We explained the reason as best we could and he said he would use his old Spade; it was not a very good one but it would do.

That is but one of the many instances that happen every day.

The jobbers are satisfied with the advanced prices. Why? Because by concerted action they have taken advantage of the rising market and have made big money on the goods they had on hand.

I'll venture the assertion that there are not a half dozen retailers in the State of Minnesota that have gone through their stock and marked up the goods on hand to conform to the advancing market. Why? Simply because that fellow across the street has not and will not do it.

Some of the advances are legitimate because the advance is only in proportion to the advance in the raw material and labor, while others are the act of some jobber or manufacturer, taking advantage of the "trust age."

Anybody who will take the trouble to figure it out can readily see that the advances manufacturers of Stoves have made upon their goods are totally out of proportion to the advance in the raw material, and it is such acts as these that will seriously reduce the year's business.

OHIO.

We are satisfied that the sharp advances in Wire and Nails have very materially reduced the amount of those goods sold. When we quote prices to farmers they reply that they will not pay the price; that they are advised by the agricultural papers not to buy, but to let their fences go for a year or two, for by that time prices will be reasonable again. So they buy Nails by the pound instead of the keg, and are making old things do, because, as we think, of the rapid advances in prices. Contractors and builders are having to revise their estimates, and the average advance of about 30 per cent. causes parties who are contemplating improvements and new buildings to hesitate and delay to some future time. While the manufacturers of Wire may not feel the effect of the advances as retail stores are feeling it, because of the great demand from the telephone companies, yet the time is coming when they will feel it. An unfortunate thing about the excessive advances is that capital is being attracted by the great profits on Nails and Wire to invest in plants for their manufacture. In ordinary times the capacity of the mills that are already in existence was ample for the demand. We do not believe that the large amount necessary to start

a mill for the drawing of Wire and the making of Nails will deter capital from entering into the making of Wire and Nails. Whatever merit there may be in large combinations of capital for the reducing of expenses, and, therefore, cost to the consumer, has not been developed by any action on the part of the combinations as yet. It seems to us that they are putting themselves in condition for some very harsh, and possibly unjust, legislation the coming winter by the several State Legislatures. Every reason put forward so far to justify the great combinations of capital has proved to be false, except the one that combinations are made to control the output in their line and to advance prices without regard to real values. We do not see much to rejoice over in the present condition of affairs. Speculation is rampant. Wild schemes are being pushed to the front. Promoters, than which there is no greater fraud, are busy as bees scattering broadcast the most alluring prospectuses of plans for other people to make a great deal of money on a very small investment. We often wonder why they do not keep these fine schemes to themselves and make all the money. The innocent and simple are taking hold of the alluring bait, and they will have the experience after a while and the rascals will have the money. We are not, as a rule, pessimistic in our views, but the outlook for the future we do not like. It bodes mischief for somebody. The man that is wise will take heed unto his ways and buy very carefully.

ILLINOIS.

The advance in my opinion does not restrict sales as much as crop failures. We here in Central Illinois have experienced four almost wheat failures. The advance in almost the whole line was O. K., as almost everything was too low.

NEBRASKA.

The high prices cause a general kick from our customers. Still, we have had a larger trade this year than for a few years back, owing to a good general crop and fair prices. New corn is worth 21 cents, oats 18 cents and wheat about 50 cents a bushel. Further advances I predict will eventually demoralize our trade completely, as people are buying only what they have to have.

MASSACHUSETTS.

We do not think the high prices interfere very much with our business. Building has been curtailed to some extent, but more from the fact that it has been almost impossible to secure material rather than on account of high prices. At the present time small dealers are buying goods more frequently and in a smaller way, perhaps, than they did a year ago, but it is now very much easier to dispose of our goods at present prices than it was a year ago at prices existing at that time.

MARYLAND.

The heavy advance in Iron Pipe and Fittings, Sheet Iron, Tin and other materials entering into the building trade has affected business, inasmuch that only such work as is necessary to be done is undertaken. A number who intended to build or improve are putting off their operations until they can get more favorable prices. If prices in metal lines advance still further between now and spring we anticipate a falling off in trade for Agricultural Implements and Builders' Supplies.

KANSAS.

There is much criticism of the recent advance in prices and in many cases customers absolutely refuse to pay the advance, and it is restricting purchases to some extent. If it continues I think it will check building in the future, as many people regard the present prices on some lines as out of reason.

ILLINOIS.

So far we cannot say that the high prices of goods have materially interfered with their sale. We think, however, that it will interfere with building operations in the spring, as there are many who feel that prices

have about reached the top and that they surely must soon recede. Feeling this way they will naturally postpone building until they are sure that there will be no weakening in prices for some time to come.

ARKANSAS.

The high prices now prevailing interfere materially with the sale of goods, especially such goods as have advanced far beyond their former prices—viz.: Barbed Wire, Smooth Wire, Nails, Iron, Shovels, Scoops, Files, &c.

Barbed Wire I have not sold a spool of in four months; formerly my sales were three to four carloads a year. Most of the other goods mentioned sales are about one-half of former sales. It is now almost impossible to sell first-class Files. I will have to get a second-class File, which I could sell at something like former prices; and so it is all around.

If the advance had been moderate, say 20 to 25 per cent., there would have been comparatively no trouble. The farmers here receive about 25 per cent. more for their cotton. The crop is short, say one-third, so really they have less money to spend than in former years, while prices all around are so much higher; hence the general discontent and decreased purchases on their part.

GEORGIA.

The advance is holding things back. I know of a large building that was being built that has been put off. Our trade is grumbling, and some say that they are going to try the wooden pegs in place of Nails. But the feeling of our customers is hopeful.

INDIANA.

The greater part of my business comes from farmers, and the condition of the market is very unsatisfactory to them. Everything they buy has advanced, and farm products are about the same price. My trade on some lines has fallen off considerably.

Barb Wire I haven't sold a pound of in six months, and but very little Plain Wire. As long as the market remains the way it is now my trade will simply buy as little as possible.

Large Shipment of Bicycles.

THE MARSHALL-WELLS HARDWARE COMPANY, Duluth, Minn., recently received a trainload of 15 cars, all carrying Bicycles exclusively for delivery to that company. They say this is undoubtedly the largest shipment of Bicycles ever made on actual sale in this country. Every car had on the side the following legend: "Oxford Bicycles for the Marshall-Wells Hardware Company, Duluth," and as the train traveled in daylight all the way through it formed quite an advertisement for the Duluth house that was enterprising enough to get up the idea. The wheels came from A. D. Meiselbach of Milwaukee, the Milwaukee branch of the American Bicycle Company. The train was photographed in Milwaukee as an advertisement for the manufacturers and it was again photographed on its arrival in Duluth. The Chicago, Milwaukee & St. Paul Road, who received the consignment, thought enough of it to arrange for a special daylight run to Duluth. The train was taken by way of Minneapolis, where it was transferred to the St. Paul & Duluth Road for another daylight run to Duluth. All along the road the train aroused much interest, and it has probably put new ideas of Duluth and her jobbing trade in the minds of those that saw it. The prominence with which the railroad company handled the shipment was entirely unsolicited on the part of the Marshall-Wells Hardware Company. We have received one of the Duluth photographs and the train makes an imposing showing.

Wood & Thoenen, who are wholesale and retail dealers in Hardware at Sault Ste. Marie, Mich., are making a large addition to their establishment, consisting of two stories and basement, the material being stone. The total floor space of the enlarged premises will be 40,000 square feet.

Weiss & Frevert, Nappanee, Ind., have moved into new quarters, 52 x 86 feet in dimensions, brick. The furniture and fixtures are all new and the store is an attractive and convenient one.

British Letter.

FROM A SPECIAL CORRESPONDENT.

IN the export or import trade it is a truism that things are not what they seem. We meet John Robinson at the club; John sells boots; and after lunch, with a self-satisfied air, John tells us that last month he sent 10,000 pairs to Timbuctoo. A little later we look up the returns and find that John, in his genial way, has been playing upon our credulity, for, lo! the total of boots exported to Timbuctoo only amounts to 3000 pairs all told, and it is notorious that Smith and Brown are competing with John. This thought has been impressed upon me recently in consequence of a Board of Trade return which I have been studying, in which I am informed that the total value of Wringers imported into this country in 1898 only amounted to £3277. I have spoken to two or three Americans in that trade and I should have thought that £100,000 would have better indicated the volume of their trade in Wringers with Great Britain.

America's Trade With Great Britain.

It may therefore be useful if I set out in tabulated form the extent of the trade which the United States does with Great Britain in metal goods, Hardware and the allied trades. With a view of showing what has been the American advance during the past five years, I will give the returns for five consecutive years, 1894 to 1898. These returns, which I extract from the annual statement of the trade of the United Kingdom with foreign countries and British possessions for 1898, will upset some preconceived notions both in the systematic increase in the trade done in several lines and by the extraordinary fluctuations in others.

Value of American Goods Sold to Great Britain

	1894.	1895.	1896.	1897.	1898.
	£	£	£	£	£
Arms:					
26,213	14,350	21,176	17,372	13,832	
Manufactures of Caoutchouc:					
64,794	101,787	106,202	106,475	117,274	
Copper, old, fit only to be remanufactured:					
27,827	23,187	42,225	38,016	26,395	
Copper, unwrought:					
1,307,121	536,682	1,523,980	1,459,993	2,051,800	
Horns:					
11,215	15,259	10,823	10,808	9,015	
Iron:					
763	1,213	455	3,199	105	
Iron, Pig and Puddled:					
4,837	14,279	47,968	209,275	180,615	
Iron, Bar, Angle, Bolt and Rod:					
1,272		1,943	19,396	9,746	
Iron, Steel unwrought:					
1,034	793	11,196	128,892	158,689	
Iron, manufactures of Iron and Steel; Sewing Machines and parts thereof:					
78,958	99,843	117,304	113,843	135,801	
Iron, manufactures of Iron and Steel, Girders, Beams and Pillars:					
			4,407	34,224	
Iron, manufactures of Iron and Steel; Tires and Axles:					
2,411	1,634	992	3,752	11,172	
Iron, Cycles and parts thereof:					
			1,506,449	2,017,386	
Iron, unenumerated:					
388,001	592,784	1,590,721	448,602	632,652	
Metal, unenumerated, unwrought:					
23,647	27,217	91,956	189,870	115,610	
Metal, unenumerated, wrought or manufactured:					
26,262	26,271	43,213	30,605	26,470	
Metal, manufactured:					
15,371	18,785	39,006	50,014	15,818	
Petroleum:					
2,096,170	2,683,174	2,984,304	2,762,842	3,023,786	
Varnish:					
19,326	19,766	25,094	28,657	29,097	
Zinc, crude, in cakes:					
36,291	26,801	133,625	211,757	225,254	
Goods, not being either in part or wholly manufactured, unenumerated:					
Atlantic:					
194,653	164,048	88,499	92,735	110,112	
Pacific:					
1,457	424	1,175	1,005	1,428	
Goods, being either in part or wholly manufactured, unenumerated:					
Atlantic:					
1,228,124	1,284,510	1,342,963	1,233,398	1,711,433	
Pacific:					
2,523	1,583	173		628	

Unenumerated Manufactured Merchandise.

There is one thing to be said for the British Board of Trade returns, and that is, they represent the minimum of the trade done. There is no assumption in these figures; the Board of Trade officials must produce chapter and verse for every figure they publish. It may therefore be

assumed that the American trade with Great Britain in some degree exceeds the figures above quoted. Although the Hardware and metal trades are inextricably mixed up, yet, if we use the term Hardware in its more restricted sense, the foregoing return does not much enlighten us as to what Great Britain is buying abroad in Hardware pure and simple. The reason for this is that the subsidiary Hardware lines have been indiscriminately classed under the heading "Unenumerated." After a good deal of pressure the British officials last year determined to put on record the details of these unenumerated manufactured goods. It is sometimes said that Great Britain is the workshop of the world, and there is a general impression abroad that we only purchase raw material and partly manufactured goods. Nothing could be more misleading. As a matter of fact Great Britain purchases every year wholly manufactured merchandise to the extent of \$700,000,000; of that amount nearly \$40,000,000 worth is unenumerated, and, in consequence, English Hardware importers have not been able to ascertain accurately the extent of their purchases from other countries, mainly, of course, from America and Germany. I am therefore glad to be able to supplement the usual statistics with a detailed statement of what has hitherto been unenumerated. Here are the items and their value for 1898:

Return of British Hardware Imports Hitherto Unenumerated.

	1898.
Brush Ware.....	\$1,348,780
Electrical Goods.....	1,837,860
Emery Wheels and Powder, Sandpaper.....	175,470
Fancy Goods.....	7,830,675
Floor Cloth, Linoleum, &c.....	640,515
Glue, Size and Gelatine.....	2,317,420
Implements and Tools.....	818,585
Lamps and Lanterns.....	523,425
Machinery, other than Iron and Steel.....	1,102,640
Papier Maché and Lacquered Ware.....	49,915
Roofing Felt, Tarpaulins, &c.....	29,565
Wooden Ware, Turnings, &c.....	4,205,210

Where American Trade Can Be Increased.

It is impossible, of course, to distinguish whether these goods are American or German, but I shall not be far out in asserting that the American figures in many respects exceed the German. Whether or not America has the preponderance in the sale of these subsidiary Hardware goods, it is perfectly clear that her business can be greatly increased. Take Brush Ware for example. At the present moment all the good Brushes sold in this country are made by half a dozen British firms; but there is a lot of German rubbish sold. The difficulty is to get something better in quality than the German and considerably less in price than the British. A large Toronto house has recently been increasing its sale with Great Britain both in Painting and Domestic Brushes. What Canada can do, so also the United States. The "Implements and Tools" referred to above is a significant item, which does not, of course, include Machine Tools, which we import under the heading "Machinery," and amounting in the course of a year to \$17,000,000 or \$18,000,000 worth. They are the small hand tools much in request by carpenters, engineers and other craftsmen. Sheffield still holds this trade on account of the reputed quality of its steel, but the American Tools are preferred in many quarters because of their neatness.

Machine Tool Business of France.

Mention of Machine Tools reminds me that we are always apt to overlook France. The importation of Machine Tools into France is constantly on the increase. During the first 11 months of 1898 it amounted in value to 7,552,050 francs, as compared with 4,594,085 francs in the same period of 1897 and 3,274,514 francs in the same comparative period of 1896. It has to be noted also that the demand for Machine Tools in France is so marked that your sister republic is making her own. She is doing more—she is exporting them, and in 1897 sold no less than 5,780,046 francs' worth to other countries, mainly to Belgium, 1,825,820 francs; Great Britain, 1,033,600 francs; Switzerland, 619,200; Germany, 523,000.

So far as the French importation of machine tools is concerned, it would appear that Germany has the larger share of the trade. Here, however, are the leading figures:

	Francs.
From Germany.....	2,027,586
From United States.....	1,611,032
From Great Britain.....	1,222,325
From Belgium.....	672,750
From Switzerland.....	236,000
From other countries.....	143,740

I have not been to France for some little time and cannot therefore speak with personal authority, but everybody knows that her industrial methods are quite her own. Two thoughts, however, suggest themselves in this connection. In the first place I am convinced that the American trade with France in Machine Tools could be largely increased by a personal study on the spot of French needs. In the second place, I am convinced that the trade could also be increased by Americans cultivating English houses exporting this line of goods to France. It would really seem that France is now sailing into calmer waters, and Frenchmen assure me that one result of the Paris Exhibition will be the stimulation of French industry. In that case we may take it that the demand for Machine Tools will be indefinitely increased, and as the *rapprochement* between France and Germany (about which we hear so much) is both unstable and political, there is every reason to suppose that French buyers are well disposed toward American manufacturers. Feeling against Great Britain in France, while not so acute as is supposed, is none the less a fact which commercial men are compelled to recognize.

Beginning of the Bicycle Year.

This is the season when the Cycle manufacturers are on the *qui vive*. They are now ready with their new designs and patterns and inventions for next year. It is well for American manufacturers to remember that out of the 10,000 Hardwaremen in this country probably 2500 handle Cycles and accessories. Just now the Cycle trade is in a perilous condition. Our exports of Cycles have gone down about 50 per cent. this year, and the Transvaal War will tend still further to depress matters. It is an opportunity which Americans would do well to take advantage of. A glance at either the British, German, French, Austrian or American consular reports shows clearly the growing demand for Cycles in all parts, not only of the civilized, but of the semi-civilized world. India, East and West Coast of Africa, Egypt, South America, Hong Kong, Japan, notwithstanding seemingly impassable roads, are all demanding Cycles. A good plan for American Cycle manufacturers is to get in touch with English buyers, and, incidentally, with English exporters, by exhibiting at either the Stanley or the National Cycle Show, which opened yesterday (November 17), the Stanley at the Agricultural Hall, Islington, London, and the National at the Crystal Palace. American houses who have hitherto exhibited continue to do so and this indicates that they are satisfied with the result.

McNary & McNary have purchased the business of J. R. Boofter, Robinson, Ill. They will rearrange the interior and also put on a plate glass front.

E. G. Steele, Eaton, Col., has taken E. B. Steele into partnership under the style of E. G. Steele & Co.

Sengel Hardware Company, Fort Smith, Ark., have incorporated. Their business is both wholesale and retail.

The store of Seward McDonald, Schenectady, N. Y., was robbed a short time since.

J. D. Greenlee has purchased C. C. Brown's interest in the firm of Brown & Brown, Heyworth, Ill., and the name of the firm has been changed to Brown & Greenlee.

Australian Letter.

MELBOURNE, October 24, 1899.

A GOOD business has been done in Hardware lines during the past fortnight. American No. 8 Fencing Wire has been in demand and a fair business done in all fencing material.

Mineral Production.

The mineral production of New South Wales for the quarter ending September 30, 1899, is as follows:

Gold, 143,423 ounces; value £500,662.
Silver, lead and ores, 125,567 tons (£542,156).
Silver, ingots and matte, 236,701 ounces (£26,631).
Copper, ingots, matte and ores, 1902 tons (£129,582).
Tin, ingots and ore, 300 tons (£40,741).
Coal exported, 715,525 tons (£256,378), showing a net increase over the previous quarter of over £330,000.

The production for the first nine months of 1899 shows an increase of over £750,000, compared with the corresponding period of 1898.

The little island of Tasmania also shows excellent returns for September, the output of minerals (£121,743) being about £34,000 in excess of the corresponding month of 1898, and the increase for the first nine months of 1899 being nearly £380,000 in excess of the first nine months of 1898.

Copper production in North Queensland is still booming, and the general manager of the Chillagoe Railway & Mining Company's properties alone estimates the ore available on his property at 500,000 tons, with an average of 10 per cent. copper.

At present it is impossible to say if the copper deposits go down to any great depth.

Edward Keep & Co.

One of the oldest established Melbourne Hardware firms have gone out of business since my last letter. The firm in question, Edward Keep & Co., were completely burned out on October 10. Some eight years ago they erected a substantial structure in Lonsdale street, and have since occupied it for warehouse and office purposes. The cost of the building was about £14,000, and at the time of the fire the firm carried about £50,000 worth of up to date stock, with insurances up to about £43,500.

The maximum amount of Gunpowder allowed to be stored (200 pounds) was carried out of the burning building, amid great excitement, by the firemen, but a large number of boxes of Cartridges blew up later on during the progress of the fire, and the fusillade, helped by the explosion of kerosene and oil drums, provided the elements of a miniature battle field.

As a consequence of the fire Edward Keep & Co. decided to relinquish the Hardware business, with which the senior partner, Edward Keep, had been connected in Melbourne for 43 years.

The firm have always occupied a leading position in the Melbourne Hardware trade, and the turnover, which of late years has averaged nearly £200,000 per annum, will doubtless be divided among other local firms.

Francis and Albert Keep, who were partners in the firm, have decided to open a coach builders' Ironmongery and Agricultural Implement business at 100 Franklin street, Melbourne.

Manufacturers and Foreign Trade.

FROM a gentleman actively identified with the introduction of American goods in Europe we have the following communication in regard to the effect of high prices here in diminishing export business, and also the apparent indifference of many manufacturers to export trade when fully occupied, as at present, in filling the domestic demand. The mistake made by them in this direction is pointed out:

The effect of the high prices now ruling is certainly detrimental to American manufacturers of Hardware

and to exporters. The manufacturers have had such a brisk demand for their goods in the United States that they have, to a great extent, neglected the export trade, and a great many have failed to take proper care of their export customers. They have already forgotten the lessons taught to them by the recent panics in the United States, when those that had any export trade to rely upon safely weathered the panics, while those depending entirely upon domestic business suffered heavy losses from the unfortunate conditions then prevailing in the United States.

The high prices now ruling have made it impossible in many cases to bring American manufactured goods and Tools into proper competition with those manufactured on this side, and a great many dealers and importers that had begun to purchase American goods have been driven back into the hands of domestic manufacturers, partly because same would make better delivery than American manufacturers, and partly due to the fact that on most of the articles it was, and still is, impossible to get reliable quotations from one mail to another. Those American manufacturers who still pay some attention to the export trade have invariably attached a string to their prices, and it has happened many times that orders were taken on this side and could not be executed on arrival in the United States simply because prices had been withdrawn, or factories were overloaded with orders and could not accept any more. This has happened to me several times and has undoubtedly happened to others in a similar way.

If I were connected with the press in the United States I should at this time urge manufacturers most strongly not to forget the lessons of the past. They can build up an export trade comparatively easily now, since there is still a good demand. It will not be easy to get European merchants to buy American goods when the markets are flooded with both domestic and foreign stocks, and that is a condition which is, in my opinion, sure to come, possibly within a year. Then there will be a clamor for export trade again and prices will recede, and then it may be too late to catch those again that have been neglected in the past.

Terms Net Cash Thirty Days.

THE following letter is from a prominent house in Iowa, who are not in favor of the abolition of the cash discount, as proposed by some manufacturers. The trade will recognize the force of the point that they make, and their suggestion that if the discount for prompt payment is to be abolished it would be to the advantage of houses in good financial position to have the terms made spot cash:

FORT MADISON, November 20, 1899.

Some manufacturers desire to shorten their terms of sale to net cash in 30 days. What does it mean? It means that it is a direct blow or injury to the best class of trade, to the ones that discount their bills. In our opinion it will only produce the one result, as follows: The "prompt pay" or discounters will lose just that portion of what has heretofore been part of their profits, while the slow pay customers will still take their usual long time. The manufacturers' argument may be that all must pay in 30 days; that of course would be reasonable, otherwise they would be discriminating. Yet if that rule can be so easily applied how is it that so many of the slow pay customers haven't paid promptly or were made to pay at the end of 60 days or at such a time when the bill became due? It cannot be denied that the hardship falls wholly and directly upon the cash buyer, taking it for granted, of course, that both can buy at the same prices. We can readily see how this new rule can be enforced upon the now cash buyers, but we fail to see how it will bring the former slow pay customer up to the 30-day limit.

If the manufacturer's business will not warrant his

allowing the cash discount for the prompt payment of bills, why not eliminate the whole practice of allowing "time" on purchases by demanding spot cash for purchases at time of shipment. We have no doubt that the average sound merchant would prefer this to the contemplated net 30 days' plan. Then all would be on an equal footing, and the fellow who now "plunges" on his credit would have to buy within the limit of his resources. There is no doubt but that spot cash terms would forever put a stop to reckless overbuying, and it would greatly curtail the number of disastrous failures, especially where people go into business to fail. If we cannot be allowed a discount for prompt cash payment of our bills we will be at least one house who would advocate "spot cash at time of shipment."

JOSEPH EHART & SON.

Requests for Catalogues, &c.

A. C. PENNIMAN & SON, Fort Scott, Kan., who have been continuously in the Hardware business at that point for 30 years, are intending to add a complete line of Stoves and House Furnishing Goods by January 1 next. They will appreciate copies of catalogues, price-lists, &c., pertaining to these goods.

Pillow & Moore, Helena, Ark., dealers in Hardware, Saddlery, Wagons, Buggies, Farming Implements and Mill Supplies, are now doing a jobbing business and will be pleased to hear from Hardware and Saddlery manufacturers with copies of price-lists, lowest quotations, &c.

The Hardware store of Benson & Crawford, Saranac Mich., was destroyed by fire on the 11th inst. About one-half of the stock of general Hardware was saved and the loss was fully covered by insurance. The firm have been continuously in business without change in location or membership for 25 years. They are now doing business in temporary quarters and hope soon to be in good shape again. They request manufacturers and jobbers in their line to send catalogues and price-lists to replace those consumed by the fire.

J. H. Hixson & Co. San Pedro, Cal., have taken possession of new quarters.

Cornell Bros. have purchased F. W. Weaver's stock in Ord, Neb., and will continue at the old stand, where they have also opened a plumbing and tin shop.

The store of L. D. Nichols, Baylis, Ill., was recently consumed by fire.

W. P. Mayo has retired from the Hardware and Lumber firm of Mayo Bros., Clifton Hill, Mo., and T. R. Mayo, the remaining partner, is continuing under his own name.

Seymour Billings has succeeded Pierce & Billings in the wholesale and retail Hardware and Sporting Goods business at Rutland, Vt.

F. W. Kidd has purchased the business of F. L. Chadwick, South Lawrence, Mass. Mr. Kidd also has a store at North Lawrence.

John Rogers & Co., Carthage, N. Y., have decided to discontinue business after a successful partnership of over 30 years.

John Miller, Wilbur, Neb., has sold out his stock of Hardware to Frank Warta.

C. B. Hall, Racine, Wis., is remodeling his store. Mr. Hall has been in business at the same stand for over 25 years.

D. R. Browning has sold out his stock of Hardware at Los Angeles, Cal., to Bott Bros.

New England Commercial Travelers.

A PARTY of 100 New England traveling men held a very enjoyable social meeting and dinner at the Winthrop Hotel, Meriden, Conn., on the evening of November 21. The committee of arrangements were F. M. Dean of Boston, W. H. Vialle of the American Steel & Wire Company, N. D. Merwin of the National Tube Company and H. C. Harding. Among those attending were H. F. McMinns, Howe, Brown & Co., Charles S. Davis, Gumphert Grate Company, Philadelphia; C. A. King, Parker Bros., Meriden; L. M. Dyer and D. W. Knox, F. J. Knox Company, Hartford, Conn.; Benjamin Mallory, Richmond Stove Company, Hartford, Conn.; Charles H. Tower, H. W. Johns Mfg. Company; C. F. Underwood, Dodge Mfg. Company, Boston; G. L. Sweet, Simpson, Hall, Miller & Co.; A. J. Dunlap, Dighton Furnace Company, Taunton, Mass. F. F. Dean acted as toast-master and short addresses were delivered by the Mayor of Meriden, M. E. Walstein, E. Webster Allen, William H. Vialle, George William Waite, Oscar M. Chandler, William F. Sibley, O. D. Baker and H. M. McDowell. The occasion was a reunion of the traveling men who have been regular patrons of the Winthrop since the hotel was opened 15 years ago. The goodfellowship manifested was hearty in the extreme and the affair was a success in every respect.

Decision in Favor of the United States Lock Company.

AN important decision has been rendered by Walter Johnson, examiner of interferences of the United States Patent Office, in the case of Lawson vs. Warner, covering the sheet metal knobs now being manufactured by the United States Lock Company of Clinton, Iowa. The issue in controversy is defined as follows: "The combination with the knob formed of a single piece of sheet metal struck up from a star shaped blank, one or more of the points or tongues being straight at the ends of the shank having the flange and collar, the space between the flange and collar being adapted to receive the points or tongues of the blank when shaped, the portion of the shank intermediate the flange and collar having one or more flat faces adapted to contact with the straight end or ends of the blank, substantially as shown for the purpose described." The decision of the examiner is in all respects in favor of Lawson, whose patent is now owned by the United States Steel Lock Company, stating that he finds no reasonable doubt that Lawson conceived and reduced to practice the specific construction defined by the issue. The limit of appeal from this decision will expire December 5, 1899.

S. F. Myers Company's Catalogue.

S. F. MYERS COMPANY, 48-50 Maiden Lane, New York, manufacturing and wholesale jewelers, have issued their annual catalogue No. 100. It is a book of over 700 pages, 8½ x 13 inches, profusely illustrated. It represents not only watches, diamonds and other fine jewelry usually carried by strictly jewelry houses, but also a vast assortment of intermediate and moderate priced goods such as can be handled advantageously by the hardware trade. Aside from the finer goods there are 80 pages of silver plated ware, 42 pages of optical goods, 44 pages of badges and emblems, 8 pages of bronze lamps, 20 pages of camera and photographic supplies, 48 pages of musical instruments, &c. An important feature of the book is its arrangement, which is such that the volume can be used to sell goods from without the purchaser knowing the name or address of the New York house. A number of the illustrations are in color and the list prices are high enough to show customers.

Isaac Walker Hardware Company's New Catalogue.

ISAAC WALKER HARDWARE COMPANY, Peoria, Ill., whose business was established in 1842, have just issued their first large catalogue, illustrating and describing the large assortment of merchandise they deal in, which includes general Hardware, Mechanics' Tools, Tin Plate and Metals, Cutlery and Silver Plated Ware, Guns, Ammunition, Fishing Tackle, &c. There are 768 pages, each 9 x 11½ inches, and the book is handsomely bound in leather and cloth. Attention is called to the arrangement of Locks and Door Sets, Locks of the same design being shown on contiguous pages. On a margin of each page is a fac-simile of the firm signature. This business was established 57 years ago, and was incorporated in 1881. The company have just occupied a fine new building having five floors above the street, each 55 x 175 feet, at 514-516 South Washington street, an engraving of which is shown in the front of the book.

A Factory Dining Room.

CLEVELAND TWIST DRILL COMPANY, Cleveland, Ohio, have just fitted up a dining room in one of the rooms of their factory in which a hot luncheon will be served to their employees at noon. This experiment is a further proof of their conviction that anything the company can do to keep up and advance the tone of their workmen enables the management to get out better and more accurate work. Their idea is that the neatness and completeness of the factory tend to produce in the employees a spirit that insures better results, and the dining room idea is merely the most recent of such improvements. All such influences serve to keep the men in the factory at noon and away from the allurements of saloons and cheap boarding houses. The company supply the help with facilities for quickly washing and making themselves tidy, and believe that in furnishing a good hot meal at less than it can be bought for at the saloon, the general effect will reflect itself in the factory output and justify the expenditure of time and money incidental to the getting out, furnishing and caring for such an enterprise.

Price-Lists, Circulars, &c.

THE BRIDGEPORT CHAIN COMPANY, Bridgeport, Conn.: Catalogue No. 6 of Wire and Flat Metal Chains, also Hardware Specialties and Metal Stampings.

IDEAL MFG. COMPANY, New Haven, Conn., issue No. 12 "Ideal Handbook of Useful Information." Among new features is a table comparing weights of Black and Smokeless Powders, 1899 Model Loading Machines, special Bullet Molds, &c.

Trade Items.

WARREN D. ROLLINS, a member of the firm of John G. Rollins & Sons, export merchants, 15 Whitehall street, New York, and Liverpool, England, is a passenger on the "Umbria," due here December 2. Mr. Rollins has represented the firm abroad three years, and returns to consult with other members of the firm and manufacturers they represent. Mr. Rollins was for several years connected with leading Hardware manufacturing companies in the United States, and has been very successful in introducing abroad some lines of goods that had not previously been exported. He finds that the great advance in prices in this country is curtailing business, especially in products made from Iron and Steel.

THE doors of the building known as the American Exhibit, at the coming Paris Exposition, are to be hung with the Wilcox Trolley Door Hangers. An order for the Hangers has just been received by the makers, Wilcox Mfg. Company, Aurora, Ill.

THE trade will observe among the Special Notices one signed "Long Established," which is deserving the attention of manufacturers who are desirous of representation in this city with a view to securing either export or domestic trade. The advertiser has for a number of years been connected with the trade both at home and abroad, and has wide acquaintance and connections.

U. T. HUNGERFORD BRASS & COPPER COMPANY, 120 Worth street, New York, sales agents for the United States Cartridge Company, are sending out gratuitously a sample of their Krag-Jorgensen 30-Caliber Smokeless United States Government Cartridge, complete with bullet and primer, but without powder charge. This souvenir is identical with the Cartridges they are manufacturing for the Government, and which are now being used by our army in the Philippines.

Bicycle Foot Pump.

John H. Graham & Co., 113 Chambers street, New York, are the selling agents for a telescope pocket foot pump for bicycle use, made by Braunsdorf-Mueller Company, Elizabeth, N. J. Closed it is 6½ inches long, with a diameter of 1½ inches. There are three tubes and extended it is 16 inches long over all. There is a hinged wire foot piece to hold the pump rigid while pumping. It weighs but 7 ounces and can readily be carried in pocket or tool bag. The telescoping tubes give greater capacity and more power.

William Robertson & Son, Halifax, N. S., wholesale and retail Hardware merchants, have lately remodeled their establishment, materially adding to its attractiveness and convenience as well as its capacity. The premises are 60 feet front, 120 feet deep and four stories high. The house refer to business as better than for the past 15 years, sales thus far this year being 50 per cent. in excess of last year for the same period.

Triumph Steel Hooks.

The Bridgeport Chain Company, Bridgeport, Conn., are the manufacturers of Triumph steel hooks, as here illustrated. Reference is made by the company to the

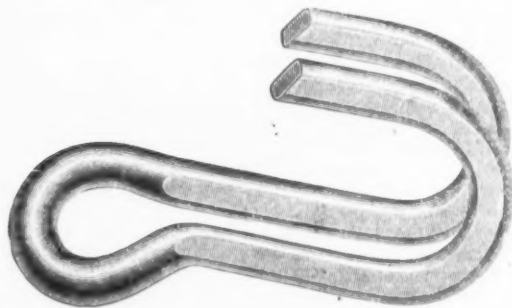


Fig. 1.—Triumph Steel Hook.

popularity of this hook with the trade who deal in the Triumph and other types of weldless steel wire chains made at this factory. Fig. 1 illustrates the hook as sent

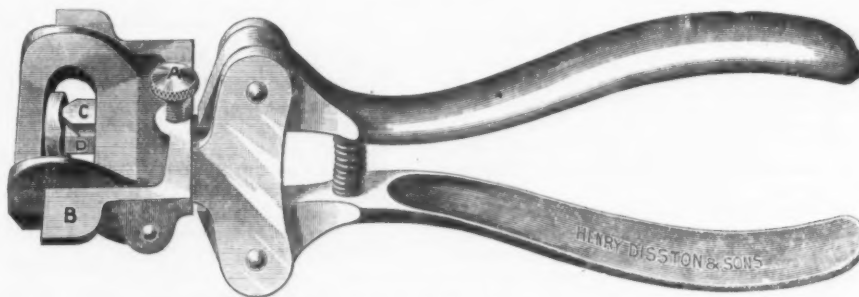


Fig. 2.—Hook Closed in Section No. 4/0 Triumph Chain.

out, it being so constructed that a hammer blow on the eye will close the space after attaching the hook to the end of a chain, as seen in Fig. 2, or the eye can be pinched together in the jaws of a vise. A hard drawn steel wire is used in the production of this hook and the hook portion is flattened, which, it is said, is stronger than malleable, cast or wrought iron construction. The manufacturers also refer to the filling of some large orders for these hooks in brass and call particular attention to the added toughness and strength which results from flattening the prongs of the brass hooks.

Triumph Saw Set.

Henry Disston & Sons, Philadelphia, Pa., have put on the market the Disston Triumph saw set, here illustrated. The company describe its characteristics as follows: The principal feature is the use of two plungers operated by the two levers or handles; pressure on the lower lever forcing plunger D against the body of the saw, thus holding it rigidly in position and preventing slipping, while a continuation of the pressure on the upper lever operates plunger C in setting the tooth. In action it is easy and powerful, and while it will set wide and heavy saws it is also adapted for narrow blades, such as web saws, narrow band saws, &c. By means of gauge B a uniformity of set may be secured. Another important point is, the head of the set is made open, enabling the operator



Triumph Saw Set.

to quickly adjust the saw set to the tooth, the work being in plain view at all times. The gauge B, for regulating depth of set, has a wider bearing than in most saw sets, thus doing away with the tendency to incline the tool to one side or the other, which would give an uneven

set to the teeth. The anvil is fitted with four beveled surfaces, suitable for different sizes of teeth.

In use the anvil is adjusted so that the bevel most suitable for the size of tooth to be set is brought into position. The set is then hung on the saw blade so that the gauge B rests on the teeth, adjusting the gauge for the depth of set to be given, by the use of set screw A. Care must be taken not to go too deeply into the tooth, as all of the set should be in the tooth itself. Taking too deep a hold is liable to distort the body of the blade or break out the teeth. The top of plunger C should be in line with the top of tooth to be set. The set is manufactured in three sizes, the smaller size being suitable for hand saws, back saws, web saws, narrow band saws, &c.; the medium size for small circular saws, &c., and the large size for cross cut saws, circular saws, &c. All the sets are polished.

Punching Bag Swivel.

Milwaukee Automatic Machine Company, Milwaukee, Wis., for whom John H. Graham & Co., 113 Chambers street, New York, are selling agents, have put on the market the punching bag swivel here illustrated. It is intended for use in gymnasiums, &c., where the space used for suspending a punching bag is often otherwise occupied. In



Punching Bag Swivel, with Wired Revolving Cup.

setting the swivel up a hole $1\frac{3}{4}$ inches in diameter is bored to receive the body. The lower or bell portion is unscrewed and the main part fastened with three screws permanently to the wall. On the inner side is a revolving cup above the bell, through which is passed a $\frac{1}{4}$ -inch rope, from which the bag swings at the lower end. The extreme diameter of the device is $2\frac{3}{8}$ inches, which leaves a $\frac{1}{4}$ -inch flange on all sides of the body. The bell-shaped bottom saves wear and tear on the rope, and it is said the bag will play faster and truer, as the rope is always suspended from a dead center. One of the advantages of this swivel is that the bag can be quickly put up or removed

by unscrewing or screwing on the bell or lower part, the upper portion always remaining in the ceiling. In this way no change or readjustment of the length of the rope is necessary. The swivel is polished and nicked, and what is seen is of an attractive character.

Among the Hardware Trade.

Bailey & Rinefort have succeeded I. S. Bailey, Jr., in the retailing of Hardware, Plumbing Goods, &c., Grinnell, Iowa. The firm occupy a new store which has lately been completed. It is equipped with the Warren patent shelving, cash carrier system and other modern fixtures.

M. S. Harrison & Co., Tifton, Ga., have lately embarked in the retail Hardware, Stove, Tinware, Agricultural Implement and Sporting Goods business.

W. G. Reichley, senior member of the firm of Reichley & Allison, York, Pa., has disposed of his interest to his son, W. J. Reichley, who now owns a two-thirds interest in the business, A. H. Allison controlling the other third. The business is being continued under the same style as heretofore.

Howard Roberts and Walter Bridges have purchased the store formerly conducted by C. M. Gibbs, Greenfield, Ind., and the style of the new firm is Roberts & Bridges.

The store of Faith & Rommel, Latham, Ill., was robbed of a quantity of Pocket Knives, Razors, &c., a short time since.

The McGregor-Noe Hardware Company, Springfield, Mo., are making important additions to their establishment, which will largely increase their facilities.

Frank H. Prunk is carrying on under his own name the business formerly conducted under the style of Everroad & Prunk, 522 Indiana avenue, Indianapolis, Ind.

The store of F. M. Taylor, Port Huron, Mich., was recently damaged by a leaking water pipe.

W. B. Scrimshire, Fort Worth, Texas, has bought T. J. Hamilton's Hardware business, formerly conducted by T. W. Lake, and has added the stock to his line of Farm Implements, Buggies, Wagons, &c.

Krause & Hunt, Albion, Neb., have dissolved partnership. P. A. Krause is successor at the old stand.

The Dickerman Hardware & Supply Company, Wallingford, Conn., will be settled in new quarters about December 1, where they hope to be better able to serve their patrons than heretofore. Their floor space has been increased 2500 square feet and a number of convenient fixtures for displaying and accommodating goods are being installed.

W. L. Kent, Brooklyn, Pa., has purchased F. H. Kent's interest in the retail Hardware, Stove and Implement business and is continuing under his own name.

O. H. Ellis has lately opened up in the Hardware, Stove and Agricultural Implement business at Montgomery, Mich.

Forty dollars' worth of goods were recently stolen from the store of J. R. Weber & Co., Quakertown, Pa.

E. Newton has purchased J. Boatman's interest in the firm of Boatman & Montgomery, Rosedale, Ind., and the style has become Montgomery & Newton, who expect to carry a larger stock than was formerly the case and to add a line of Buggies and Wagons.

B. L. Kenyon of Hope Valley, R. I., has opened up in the Hardware business at Moosup, Conn., under the title of Moosup Hardware Company. Mr. Kenyon is successor to Hollis H. Lyman, who has moved to Willimantic, where he is now a member of the new firm of Brown & Lyman.

The Cline Grocery Company, Sunnyside, Wash., are adding a line of Hardware to their former stock of general merchandise.

R. W. Boyd has bought the interest of James M. Berry in the Hampton Hardware Company, Marysville, Cal., which business continues without change in style.

H. Pfeiffer & Son have succeeded the J. Peters Hardware Company, Fort Wayne, Ind.

Although their establishment is comparatively new and larger than the former one Krakauer, Zork & Moye, wholesale and retail Hardware merchants, El Paso, Texas (with store also in Chihuahua, Mexico), find it already

too small and contemplate putting on another story. They have lately taken up the sale of Paints and carry a large and complete stock in this line. Business is reported as excellent.

Howard & Waite Bros. are successors to N. E. Westover, Blunt, S. D., dealers in Hardware, Stoves, Tinware, &c.

Gislason Bros.' Hardware store at Minneota, Minn., was robbed a short time since of \$100 worth of goods.

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Current Hardware Prices.

REVISED NOVEMBER 28, 1899.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. They apply to such quantities of goods as are usually purchased by retail merchants. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Cut Prices.—In the present condition of the market, while many advanced prices are announced by the manufacturers, lower prices are often made by the wholesale trade who have stocks on hand purchased at former quotations.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (April 6, 1899), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters Blind—

Domestic, $\frac{1}{2}$ doz. \$3.00...33 $\frac{1}{2}$ @33 $\frac{1}{2}$
North's...10 $\frac{1}{2}$
Zimmerman's—See Fasteners, Blind.

Window Stop—

Ives' Patent...25 $\frac{1}{2}$
Taplin's Perfection...50 $\frac{1}{2}$

Ammunition—See Caps, Cartridges, Shells, &c.

Anvils—American—

Eagle Anvils... $\frac{1}{2}$ doz. 7 $\frac{1}{2}$ @7 $\frac{1}{2}$
Hay-Budden, Wrought... $\frac{1}{2}$ doz. 9 $\frac{1}{4}$
Horseshoe brand, Wrought... $\frac{1}{2}$ doz. 9 $\frac{1}{4}$
Samson... $\frac{1}{2}$ doz. 7 $\frac{1}{2}$ @7 $\frac{1}{2}$
Trenton, Wrought... $\frac{1}{2}$ doz. 8 $\frac{1}{4}$ @8 $\frac{1}{4}$

Imported—

Armitage's Mouse Hole...8 $\frac{1}{4}$ @9 $\frac{1}{4}$
Peter Wright's...9 $\frac{1}{2}$ @9 $\frac{1}{2}$

Anvil, Vise and Drill—

Millers Falls Co., \$18.00...20 $\frac{1}{2}$

Apple Parers—See Parers, Apple, &c.

Augers and Bits—

Common Double Spur...60 $\frac{1}{2}$ @10 $\frac{1}{2}$
Boring Machine Augers...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Car Bits, 12-in. twist...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Jennings' Pattern...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Auger Bits...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Ford's Auger and Car Bits...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

Forster Pat. Auger Bits...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

C. E. Jennings & Co., No. 10 ext. lip. R. Jennings' list...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

No. 30. R. Jennings' list...25 $\frac{1}{2}$ @10 $\frac{1}{2}$

Russell Jennings...25 $\frac{1}{2}$ @10 $\frac{1}{2}$

L'Honniedieu Car Bits...15 $\frac{1}{2}$ @10 $\frac{1}{2}$

Pugh's Black...20 $\frac{1}{2}$

Pugh's Jennings' Pattern...35 $\frac{1}{2}$

Snell's Auger Bits...60 $\frac{1}{2}$

Snell's Bell Hangers' Bits...50 $\frac{1}{2}$

Snell's Car Bits, 12-in. twist...60 $\frac{1}{2}$

Wright's Jennings' Bits (R. Jennings' list)...50 $\frac{1}{2}$

Bit Stock Drills—

Standard List...65 $\frac{1}{2}$ @65 $\frac{1}{2}$

Expansive Bits—

Clark's small, \$18; large, \$28...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Lavigne's Clark's Pattern, No. 1, $\frac{1}{2}$ doz., \$26; No. 2, \$18...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Steer's No. 1, \$26; No. 2, \$18...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

Swan's...50 $\frac{1}{2}$

Gimlet Bits—

Common Double Cut, gro. \$2.75 to \$3.25

German Pattern...gro. \$5.00 to \$5.50

Double Cut, makers' lists...50 $\frac{1}{2}$ @50 $\frac{1}{2}$

Hollow Augers—

Ames...25 $\frac{1}{2}$ @10 $\frac{1}{2}$

Bonney's Adjustable, $\frac{1}{2}$ doz., \$16.50

New Patent...25 $\frac{1}{2}$ @10 $\frac{1}{2}$

Universal...20 $\frac{1}{2}$

Ship Augers and Bits—

Ford's...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

Snell's...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

L'Honniedieu's...15 $\frac{1}{2}$ @10 $\frac{1}{2}$

Watrous'...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

Awl Hafts, See Hafts, Awl.

Awls—

Brad Awls:

Handled...gro. \$2.75 to \$3.10

Unhandled, Shouldered, gro. \$3.50 to \$4.00

Unhandled, Patent...gro. 66 $\frac{1}{2}$ @70 $\frac{1}{2}$

Peg Awls:

Unhandled, Patent...gro. \$1 to \$1.50

Unhandled, Shouldered, gro. \$5 to \$7

Scratch Awls:

Handled, Common...gro. \$5.50 to \$6.00

Handled, Socket...gro. \$11.50 to \$12.00

Awl and Tool Sets—See Sets, Awl and Tool.

Axles—

Concord, loose collar...6 $\frac{1}{4}$ @6 $\frac{1}{4}$

Concord, solid collar...6 $\frac{1}{4}$ @6 $\frac{1}{4}$

No. 1 Common...5 $\frac{1}{2}$ @5 $\frac{1}{2}$

No. 1 $\frac{1}{2}$ Com. New Style...5 $\frac{1}{4}$ @5 $\frac{1}{4}$

No. 2, Solid Collar...5 $\frac{1}{4}$ @5 $\frac{1}{4}$

Nos. 7, 8, 11 to 14...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Nos. 7, 8, 11 to 14, 100 sets...60 $\frac{1}{2}$

Nos. 15 to 18...60 $\frac{1}{2}$

Nos. 19 to 22...60 $\frac{1}{2}$

Boxes, Axle—

Common and Concord, not turned...lb. 6c

Common and Concord, turned...lb. 6c

Half Patent...lb. 9c

Balances—

Sash—

Caldwell low list...25 $\frac{1}{2}$

Pulman's...62 $\frac{1}{2}$

Spring—

Spring Balances...50 $\frac{1}{2}$ @50 $\frac{1}{2}$

Chatillon's Light Spz. Balances...40 $\frac{1}{2}$ @10 $\frac{1}{2}$

Chatillon Straight Balances...40 $\frac{1}{2}$

Chatillon Circular Balances...50 $\frac{1}{2}$

Chatillon's Large D al...50 $\frac{1}{2}$

Barb Wire—See Wire, Barb.

Bars—Crow—

Steel Crowbars, 10 to 40 lb., per lb...4 $\frac{1}{2}$ @4 $\frac{1}{2}$

Beams, Scale—

Scale Beams, List Jan. 12, '92...50 $\frac{1}{2}$ @30 $\frac{1}{2}$

Chatillon's No. 1...30 $\frac{1}{2}$

Chatillon's No. 2...40 $\frac{1}{2}$

Beaters—Egg—

Standard Co., No. 5 Steel Handle Dover, $\frac{1}{2}$ gro. \$6.50

No. 10 Cast Handle Dover, $\frac{1}{2}$ gro. \$8.00

No. 10 S. C. el Handle Dover, $\frac{1}{2}$ gro. \$8.00

No. 15 Extra Heavy Steel Handle, $\frac{1}{2}$ gro. \$15.00

Rival, $\frac{1}{2}$ gro. \$10.00

Taplin Mfg. Co., $\frac{1}{2}$ gro. \$17.00

No. 50 Small Family size...\$6.50

No. 100 Regular Family size...\$8.00

No. 102 Regular Family size, tinned...\$9.50

No. 150 Large Family size...\$13.00

No. 150 Large Family size, tinned...\$17.00

Lyon's Standard lse... $\frac{1}{2}$ doz. \$1.75

Wonder (S. S. & Co.)... $\frac{1}{2}$ gro. \$7.50

Bellows—

Blacksmith—

Standard List...70 $\frac{1}{2}$ @70 $\frac{1}{2}$

Inch...30 32 34 36 38 40

Each...\$1.25 1.50 1.75 2.00 2.25 2.50

Extra Length: Each...\$1.75 2.00 2.25 2.50 2.75 3.00

Molders—

Inch...9 10 11 12 14 16 18

Doz...\$6.75 7.25 7.75 8.25 8.75 9.25 9.75

Hand—

Inch...6 7 8 9 10 12

Doz...\$3.75 4.25 4.75 5.00 5.50 6.00 6.75

Bells—Cow—

Ordinary goods...75 $\frac{1}{2}$ @10 $\frac{1}{2}$

High grade...70 $\frac{1}{2}$ @10 $\frac{1}{2}$

Jersey...70 $\frac{1}{2}$ @10 $\frac{1}{2}$

Texas Star...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Door—

Gong, Yankee...55 $\frac{1}{2}$

No. 1, R. & E. Mfg. Co.'s...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Lever and Pull, Sargent's...39 $\frac{1}{2}$ @10 $\frac{1}{2}$

Hand—

Hand Bell, Polished...65 $\frac{1}{2}$ @10 $\frac{1}{2}$

White Metal...65 $\frac{1}{2}$ @10 $\frac{1}{2}$

Nickel Plated...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Swiss...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Miscellaneous—

Farm Bells...lb. 3 $\frac{1}{2}$ @3 $\frac{1}{2}$

Steel Alloy Church and School...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Willmot & Hobbs Mfg. Co., Gong...70 $\frac{1}{2}$

Belting

Rubber—

Common Standard...70 $\frac{1}{2}$ @10 $\frac{1}{2}$

Standard...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Extra...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

High Grade...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Leather—

Extra Heavy, Short Lap...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Regular Short Lap...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Standard...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Light Standard...70 $\frac{1}{2}$

Axle Grease—See Grease, Axle.

Cotton—

Rossendale-Reddaway & B. & H. Co., Sphinx Brand...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Durable Brand...70 $\frac{1}{2}$

Bench Stops—See Stops, Bench

Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters...20 $\frac{1}{2}$

Ill. Iron & Bolt Co., 40 $\frac{1}{2}$ @40 $\frac{1}{2}$

Stoddard's Lightning Tire Upsetters...40 $\frac{1}{2}$ @50 $\frac{1}{2}$

Bicycle Goods—

Lane's Cycle Hanger...33 $\frac{1}{2}$ @35 $\frac{1}{2}$

John S. Lang's Son's 1899 list:

Chain...50 $\frac{1}{2}$

Parts...50 $\frac{1}{2}$

Spokes...50 $\frac{1}{2}$

Tubes...60 $\frac{1}{2}$

Bits—

Auger, Gimlet, Bit Stock Drills, &c.—

See Augers and Bits.

Bit Holders—See Holders.

Blind Adjusters—See Adjusters, Blind.

Blind Fasteners—See Fasteners, Blind.

Blind Staples—See Staples, Blind.

Blocks—Tackle—

Common Wooden...70 $\frac{1}{2}$ @10 $\frac{1}{2}$

Eddy's Steel...60 $\frac{1}{2}$ @10 $\frac{1}{2}$

Hariz Steel...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Ford's Star Brand, Self Lubricating, 70 $\frac{1}{2}$

Hollow Steel, Ford's Pat. Star Brand...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

Lane's Patent Automatic Lock and Junior...30 $\frac{1}{2}$

Stowell's Novelty, Mal. Iron...50 $\frac{1}{2}$

See also Machines, Hoisting.

Boards, Stove—

1899 List:

Zinc...30 $\frac{1}{2}$

Crystal and Embossed...40 $\frac{1}{2}$

Bolts—

Carriage, Machine, &c.—

Common, list Jan. 30, '95...45 $\frac{1}{2}$ @50 $\frac{1}{2}$

Norway Iron, \$3.00, list Oct. 7, '84...75 $\frac{1}{2}$ @75 $\frac{1}{2}$

Phila. Eagle, \$3.00 list...75 $\frac{1}{2}$ @75 $\frac{1}{2}$

Bolt Ends, list Jan. 30, '95...75 $\frac{1}{2}$ @75 $\frac{1}{2}$

Machine, list Oct. 1, '99...50 $\frac{1}{2}$ @50 $\frac{1}{2}$

Notes.—Jobbers' prices on Bolts are now generally lower than manufacturers'.

Door and Shutter—

Cast Iron Barrel, Round Brass Knob:

Inch...3 4 5 6 8

Per doz...\$3.35 3.55 3.75 3.95 4.15

Cast Iron Spring Foot:

Inch...6 8 10

Per doz...\$1.00 1.25 1.75

Cast Iron Chain, Flat, Japaned:

Inch...6 8 10

Per doz...\$0.85 1.20 1.50

Cast Iron Shutter, Brass Knobs:

Inch...6 8 10

Per doz...\$0.60 .90 1.15

Wrought Barrel Brass Knob:

Inch...3 4 5 6 8

Per doz...\$0.45 .50 .61 .70 1.25

Wrought Barrel...70 $\frac{1}{2}$ @10 $\frac{1}{2}$

Wrought Barrel, Bronzed...50 $\frac{1}{2}$ @10 $\frac{1}{2}$

W

Primers—	
Berdan Primers, \$1.00	5%
B. L. Caps (Sturtevant Shells)	5%
\$1.00	5%
All other primers	\$1.10 @ \$1.12
Carpet Stretchers—	
See Stretchers, Carpet.	
Cartridges—	
B. B. Caps, Com. Ball Sngl.	\$1.30
B. B. Caps, Round Ball	\$1.12 @ 1.18
Blank Cartridges:	
22 C. F., \$5.50	10¢
28 C. F., \$7.00	10¢
22 cal. Rim, \$1.50	10¢
22 cal. Rim, \$2.75	10¢
Central Fire	2%
Pistol and Rifle	15¢
Primed 8-calls and Bullets	15¢
Rim Fire Sporting	50%
Rim Fire, Military	15¢
Castors—	
Red	60¢ @ 10%
Plat	60¢ @ 10%
Plate, part Brass	60¢ @ 10%
Philadelphia	60¢ @ 10%
Martin's Patent (Phoenix)	50¢ @ 10%
Payson's Anti-Friction Truck	70¢ @ 10%
Standard Ball Bearing	45¢
Tucker's Patent, low list	45¢
Cattle Leaders—	
See Leaders, Cattle.	
Chain—	
American Coil, Full Casks:	
3-16 1/4 5-16 3/4 7-16 1/2 9-16	
8-75 6-85 5-85 5-00 4-85 4-75 4-65	
1/2 1/4 1 inch.	
4-50 4-40 4-30 4-20 cents per lb.	
Less than Cask lots add 1/4 @ 1/2 per lb.	
German Coil, list July 24, '97	60¢ @ 10¢ @ 10¢ @ 10%
German Hatter Chain, list July 24, '97	60¢ @ 10¢ @ 10¢ @ 10%
Trace, Wagon and Fancy Chains, list April, '98	50¢ @ 10¢ @ 10¢ @ 10%
Jack Chain, list July 10, '98	50¢ @ 10¢ @ 10¢ @ 10%
Iron	50¢ @ 10¢ @ 10¢ @ 10%
Brass	50¢ @ 10¢ @ 10¢ @ 10%
Gal. Pump Chain	1/2 5¢ @ 5¢
Breast, Hitching and Rein Chains	
Covert Sd. Works	50%
Covert Mfg. Co.	
Breast	35¢ @ 2%
Halter	35¢ @ 2%
Heel	35¢ @ 2%
Keel	35¢ @ 2%
Stallion	35¢ @ 2%
Oneda Community	
Eureka Coil and Halter	60¢ @ 10¢ @ 10¢ @ 10%
Niagara Coil and Halter	60¢ @ 10¢ @ 10¢ @ 10%
Niagara Cow Ties	45¢ @ 10¢ @ 10¢ @ 10%
Am. Coil and Halters	50¢ @ 10¢ @ 10¢ @ 10%
Am. Cow Ties	35¢ @ 10¢ @ 10¢ @ 10%
Wire Cows Co.	
Dog Chain	60%
Universal Disjointed Chain	35%
Chalk—(From Jobbers.)	
Carpenters', Blue	gro. 50¢ @ 50¢
Carpenters', Red	gro. 40¢ @ 40¢
Carpenters', White	gro. 36¢ @ 36¢
See also Crayons.	
Chalk Lines—See Lines.	
Checks, Door—	
Bardsley's	40¢ @ 10%
Columbia	50¢ @ 10%
Eclipse	60¢ @ 10%
Chisels—	
Socket Framing and Firmer	
Standard List	70¢ @ 10¢ @ 75¢ @ 10%
Buck Bros.	30%
Charles Buck	30%
Swan's	70¢ @ 10¢ @ 2%
L. & J. White	30¢ @ 30¢ @ 5%
Tanged—	
Tanged Firmers	40¢ @ 10¢ @ 50%
Buck Bros.	30%
Charles Buck	30%
L. & J. White, Tanged	35¢ @ 5%
Cold—	
Cold Chisels, good quality, lb. 1/2 @ 16¢	
Cold Chisels, fair quality	lb. 13¢
Cold Chisels, ordinary	lb. 8¢ @ 3¢
Chucks—	
Seach Pat., each \$8.00	20%
Skinner Patent Chucks:	
Combination Lathe Chucks	40%
Drill Chucks, Patent and Standard	30%
Drill Chucks, New Model	2%
Independent Lathe Chucks	40%
Improved Planer Chucks	20%
Universal Lathe Chucks	40%
Face Plate Jaws	35%
Union Mfg. Co.	
Combination	40%
Czar Drill	30%
Geared Scroll	30%
Independent	40%
Union Drill	30%
Universal	40%
Face Plate Jaws	35%
Clamps—	
Adjustable, Hammers	20¢ @ 20¢ @ 5%
Adjustable, Stearns	30%
Cabinet, Sargent's	45¢ @ 10%
Carriage Makers', P. S. & W. Co.	40¢ @ 10%
Carriage Makers', Sargent's	50¢ @ 10%
Best, Parallel	83¢ @ 10%
Lineman's, Udea Drop Forge & Tool Co.	40%
Saw Clamps, see Vises, Saw Filers	
Cleaners, Walk—	
Star Socket, All Steel	per doz. \$4.00 net
Star Shank, All Steel	per doz. \$3.75 net
Cleavers, Butchers—	
Post Bros.	30%
New Haven Edge Tool Co.'s	40¢ @ 10¢ @ 5%
Nichols Bros., Flat hdl., 30%; Rd. hdl., 40%	
Fayette R. Plumb	25%
P. S. & W.	33¢ @ 5¢ @ 33¢ @ 10%

L. & J. White	
Clippers—	
Chicago Flexible Shaft Company:	
Handy Toilet	per doz. \$7.30
Mascotte Toilet	per doz. \$8.40
Monitor Toilet	per doz. \$9.00
Stewart's Patent	per doz. \$10.00
Clips, Axle—	
Eagle and Superior 1/4 and 5-16 inch	65¢ @ 10¢ @ 70%
Norway, 1/4 and 5-16 inch	65¢ @ 10¢ @ 70%
Cloth and Netting, Wire—	
See Wire, &c.	
Cocks, Brass—	
Hardware list (Globe, Kerosene, Lever Bibbs, Racking, &c.)	
60¢ @ 10¢ @ 60¢ @ 10¢ @ 10%	
Coffee Mills—See Mills, Coffee.	
Collars Dog—	
Brass, Pope & Stevens' list	40%
Embossed, Gilt, Pope & Stevens' list	40%
Leather, Pope & Stevens' list	40%
Compasses, Dividers, &c.	
Ordinary Goods	70¢ @ 10¢ @ 75%
Bemis & Call Hdw. & Tool Co.	
Dividers	65%
Callipers, Call's Patent Inside	55%
Callipers, Double	65¢ @ 10%
Callipers, Inside or Outside	65¢ @ 10%
Callipers, Wing	60%
Compasses	50¢ @ 5%
J. Stevens & T. Co.	25¢ @ 10%
Coolers, Water—	
S. S. & Co.: 2-gal., \$14.00; 3-gal., \$16.00; 4-gal., \$18.50; 6-gal., \$23.00.	
Coopers' Tools—	
See Tools, Coopers'.	
Cord—Sash—	
Braided, Drab	lb. 21¢ @ 25¢
Braided, White, Common	lb. 15¢ @ 17¢
Cable Laid Italian, lb. A, 1sc; B, 1sc	Common India
Cotton Sash Cord, Twisted	10¢ @ 15¢
Patent Russia	lb. 12¢ @ 15¢
Cable Laid Russia	lb. 13¢ @ 15¢
India Hemp, Braided	lb. 11¢ @ 15¢
India Hemp	lb. 9¢ @ 10¢
Patent India	lb. 10¢
Pearl Braided, cotton	lb. 10¢
Massachusetts, White	lb. 20¢
Massachusetts, D. ab.	lb. 24¢
Eddy-stone Braided Cotton	lb. 18¢
Harmony Cable Laid Italian	lb. 18¢
Oswawa Mills	
Crowns, Solid Braided White	lb. 18¢
Braided, Giant, White	lb. 17¢
Peerless:	
Cable Laid Italian	16¢
Cable Laid Russian	14¢
Cable Laid India	12¢
Braided India	18¢
Phoenix, White	17¢
Braided, Drab Cotton	lb. 31¢
Braided, Italian Hemp	lb. 31¢
Braided, Linen	lb. 44¢
Braided, White Cotton, Spot	lb. 27¢
Silver Lake:	
A quality, Drab, 40¢	15¢ @ 10%
A quality, White, 85¢	15¢ @ 10%
B quality, Drab, 35¢	15¢ @ 10%
B quality, White, 30¢	15¢ @ 10%
Italian Hemp, 40¢	15¢ @ 10%
Linen, 57¢	15¢ @ 10%
Wire, Picture—	
Braided or Twisted	70¢ @ 70¢ @ 10%
Corn Knives and Cutters—	
See Knives, Corn.	
Crackers, Nut—	
Little Giant	per gr. \$24.00
Turner & Seymour Mfg. Co.	50%
Cradles—	
Grain	50%
Crayons—	
White Round Crayons, gross	5¢ @ 5¢
Cases, 100 gro., \$5.50 @ \$5.00, at factory.	
Metal Workers' Crayons, gr. \$2.50	
Soapstone Pencils, round, flat or square	gr. \$1.50
Rolling Mill Crayons	gr. \$2.50
Railroad Crayons (composition)	gr. \$2.00
See also Chalk.	
Creamery Pails—See Pails, Creamery.	
Crooks, Shepherds—	
Fort Madison, Heavy	per doz. \$7.00
Fort Madison, Light	per doz. \$6.50
Crow Bars—See Bars, Crow.	
Cultivators—	
Victor Garden	per doz. \$10.00
Cutters—	
Glass—	
Smith & Hemmingsway Co.	30%
Meat—	
American	1 2 3 4 5 6 7 8 9 10
Nos.	1 2 3 4 5 6 7 8 9 10
Each	\$5 \$7 \$10 \$25 \$50 \$80
Connecticut	
Nos.	1 2 3 4 5 6 7 8 9 10
Each	\$1.75 2.25 3.00 4.00 5.50
Enterprise	35¢ @ 25¢ @ 75%
Nos.	5 10 12 22 32
Each	\$2 \$3 \$2.50 \$4 \$6
Dixon's	per doz. 33¢ @ 10%
Nos.	1 2 3 4 5 6 7 8 9 10
Each	\$14.00 \$17.00 \$19.00 \$30.00
Hale's	per doz. 30¢ @ 10¢ @ 70%
Nos.	1 12 13
Each	\$27.00 \$33.00 \$45.00
Home No. 1	per doz. \$26.00
Little Giant	per doz. 33¢ @ 33¢ @ 5%
Nos.	305 310 318 340 322
Each	\$35.00 \$45.00 \$44.00 \$75.00 \$85.00

Miles' Challenge, per doz.	
Nos.	45¢ @ 45¢ @ 10%
New Triumph No. 005, per doz.	\$22.00 \$30.00 \$40.00
Woodruff's, per doz.	33¢ @ 5%
Nos.	100 150
Chadborn's Smoked Beef Cutter, per doz.	\$15.00 \$18.00
Enterprise Beef Shavers	per doz. \$60.00
Enterprise Beef Shavers	per doz. \$25 @ 30%
Slaw and Kraut—	
Henry Dis on & Son's:	
Slaw, C. Rn Grater, &c.	40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9, 55%	
Kraut Cutters 36 x 12, 40 x 12	40%
Tucker & Dorsey Mfg. Co.	
Kraut Cutters	50¢ @ 50¢ @ 10%
Slaw Cutters, 1 Knife, per gr.	\$15 @ 15%
Slaw Cutters, 2 Knife, per gr.	\$20 @ 20%
Tobacco—	
All Iron, Cheap	per doz. \$4.25 @ \$4.50
Enterprise	per doz. \$25 @ 30%
National	per doz. \$25 @ 40%
Sargent's	per doz. \$24.00 60¢ @ 60¢ @ 10%
Washer—	
Appleton's	per doz. \$16.00
60¢ @ 10¢ @ 60¢ @ 10¢ @ 10%	
Bonney's	per doz. \$4.75
Diggers, Post Hole, &c.—	
Iwan's Improved Post Hole Auger	40%
Iwan's Perfection Post Hole Digger	per doz. \$10.00
Never-Break Post Hole Diggers	per doz. \$24.00
Samson	per doz. \$34.00 25%
Dividers—See Compasses.	
Dog Collars—See Collars, Dog.	
Door Checks—	
See Checks, Door.	
Door Springs—	
See Springs, Door.	
Drawers, Money—	
Tucker's Pat. Alarm Till No. 1, per doz.	\$15; No. 2, \$12; No. 3, \$11; No. 4, \$12.
Drawing Knives—	
See Knives, Drawing.	
Drills and Drill Stocks—	
Common Blacksmiths' Drill, each	
Blacksmiths' Self-feeding	\$1.75 @ \$2.00
Bench Drills, Stearns	50%
Breast, Millers Falls, each \$3.00	15¢ @ 10%
Breast, P. S. & W.	30¢ @ 30¢ @ 10%
Goodell Automatic Drills	40¢ @ 50¢ @ 10%
Ratchet, Curtis & Curtis	40%
Ratchet, Parker's	40%
Ratchet, Weston's	20¢ @ 25%
Ratchet, Whitney's, P. S. & W.	40¢ @ 10%
Whitney's Hand Drill, No. 1, \$10.00;	Adjustable, No. 10, \$12.00 33¢
Twist Drills—	
Standard List	65¢ @ 65¢ @ 10%
Drill Bits or Bit Stock	
Drills—See Augers and Bits.	
Drill Chucks—See Chucks.	
Dripping Pans—	
See Pans, Dripping.	
Drivers, Screw—	
Balsey's Screw Holder and Driver, per doz.	2 1/2-in. \$9; 4-in. \$7.50 6-in. \$9.40
Buck Bros.	30%
Buck Bros' Screw Driver Bits	27¢
Champion	40¢ @ 10%
Disston's Flat Blade, Elec. ric. &c.	70%
Douglas Mfg. Co.	20¢ @ 20¢ @ 10%
Fray's Hol. Hdw. Seta, No. 3, \$12.00	50%
Gay & Parsons' Ratchet	95%
Goodell's Automatic	50¢ @ 10¢ @ 50¢ @ 10¢ @ 10%
Mayhew's Black Handle	50%
Mayhew's Monarch	45¢ @ 10%
New England Specialty Co.	50¢ @ 10%
Sargent & Co.'s	
Nos. 1, 50, 55 and 60, 50¢ @ 10¢ @ 10%	
Nos. 20 and 40	60¢ @ 60¢ @ 10%
Screw Driver Bits	per doz. 50¢ @ 70%
Stanley's R. & L. Co.'s:	
No. 64, Varnished Handles	70¢ @ 10%
No. 86	75¢ @ 10%
Swan's:	
Nos. 65 to 68	50%
No. 40	40¢ @ 10%
Nos. 25, 35 and 45	20¢ @ 10¢ @ 10%
Egg Beaters—See Beaters, Egg.	
Emery—Nos. 4 to 54 to Flour, C.F.—	
46 gro. 1.80 gro. F.F.F.	
Kegs	lb. 4/6c 5 c 5 c
1/2 Kegs	lb. 4/6c 5/4c 5/4c
1/4 Kegs	lb. 5 c 5/4c 5/4c
10-lb cans, 10	
in case	6 c 6/4c 5/4c
10-lb cans, less	
than 10	10 c 10 c 8c
Enameled and Tinned Ware—See Ware, Hollow.	
Escutcheon Pins—	
See Pins, Escutcheon.	
Extractors, Lemon Juice—	
See Squeezers, Lemon.	
Fasteners, Blind—	
Zimmerman's	50¢ @ 10%

Faucets—

Cork Lined..... 70¢@70¢10¢5%

Metallic Key, Leather Lined..... 70¢@70¢10%

Red Cedar..... 50¢@50¢5%

B. & L. B. Co.:

West's Lock, Open and Shut Key50¢10%

John Sommer's Peerless Tin Key..... 40%

John Sommer's Boss Tin Key..... 50%

John Sommer's Victor Metal Key.60¢10%

John Sommer's Duplex Metal Key..... 60%

John Sommer's Diamond Lock..... 40%

John Sommer's I. X. L. Cork Lined..... 50%

John Sommer's Reliable Cork Lined..... 50%

John Sommer's Common Cork Lined.70%

John Sommer's Chicago Cork Lined..... 60%

John Sommer's O. K. Cork Lined..... 50%

John Sommer's Perfection Cedar..... 40%

Star..... 60¢@60¢5%

Star, Metal Plug new list..... 40¢@40¢5%

Lockport, Metal Plug, reduced list.60¢5%

Self Measuring:

Enterprise, per doz. \$36.00 40%

Lane's, per doz. \$36.00..... 33%

National Measuring, per doz. \$36.00.... 40%

Felloe Plates—

See Plates, Felloe.

Files—Domestic—

List revised Nov. 1, 1899.

Best Brands 70¢@70¢10%

Good Brands..... 75¢@75¢10%

Fair Brands..... 75¢10¢@80%

Second Quality..... 80¢10¢@80¢10%

Imported—

Stubs' Tapers, Stubs' list, July 24, '97..... 25%

Fixtures, Grindstone—

Net Prices:

Inch..... 15 17 19 21 24

Per doz. \$3.50 3.55 3.75 4.50 5.25

Stowell's Giant Grindstone Hanger..... per doz. \$6.00

Stowell's Grindstone Fixtures..... 50%

P. S. & W. Co..... 50¢10¢10%

Reading Hardware Co..... 30¢20¢10%

Sargent's Patent..... 60¢10¢@60¢10¢10%

Fluting Machines—

See Machines, Fluting.

Fodder Squeezers—

See Squeezers, Fodder.

Forks—

Aug. 1, 1899, list.

Hay, 2 tine..... 65%

Hay, 3 tine..... 66%

Manure, 4 tine..... 70%

Manure, 5 and 6 tine..... 70%

Spading..... 70¢5%

Iowa Dig-Eay Potato..... 75%

Victor, Hay..... 70%

Victor, Manure..... 70%

Victor, Header..... 70¢12%

Champion, Hay..... 60¢20%

Champion, Manure..... 70%

Columbia, Hay..... 60¢5%

Columbia, Manure..... 70%

Columbia, Spading..... 70¢10%

Hawkeye Wood Barley 4 tine per doz. \$5.00; 6 tine, \$6.00.

Plated.—See Spoons.

Frames—

Saw—

Red, Polished and Varnished..... doz.* 1.05¢@1.10

White..... doz. 75¢@80¢

Screens, Window and Door—

Bonanza Window Screens... 50&10&2%

Phillips' Window Screen Frames..... 60%

Porter's Extension Window Screens..... 50&10%

Wabash Spring AdJ. Screen..... 50%

Warner's Screen Corner Irons..... 50%

Freezers, Ice Cream—

Qts..... 2 3 4 6 8 10

Best, \$1.60 1.60 1.85 2.30 3.00 3.90

Good \$1.25 1.35 1.70 2.05 2.65 3.50

Fair \$1.00 1.10 1.50 1.75 2.30 2.90

Fruit and Jelly Presses—

See Presses, Fruit and Jelly.

Fry Pans—See Pans, Fry.

Fuse—

Per 1000 Feet.

Hemp Fuse\$2.60

Cotton Fuse.....2.90

Single Taped Fuse.....3.50

Double Taped Fuse.....4.70

Triple Taped Fuse.....5.70

Gates, Molasses and Oil—

Stebbin's..... 80¢@80¢10%

Gauges—

Marking, Mortise, &c..... 60¢@10¢@60¢10¢10%

Barrett's Comb. Roller Gauge..... per doz. \$2.75@7.25

Stanley R. & L. Co.'s Butt & Rabbet Gauge..... 25¢10%

Wire, Brown & Sharpe's..... 40¢

Wire, Morse's..... 10¢

Wire, P. & W. Co..... 10¢10¢10%

Gimlets—

Nail, Metal, Assorted, gro. \$1.50@1.75
Spike, Metal, Assorted, gro. \$3.00@3.50
Nail, Wood Handled, Assorted,
gro. \$4.00@4.50
Spike, Wood Handled, Assorted,
gro. \$5.00@5.25

Glass, American Window
List Nov. 13, 1899.

Small lots from store:
Eastern.....80¢@100¢@20¢
Western.....80¢@100¢@20¢
From Factory, with Frit, Allowance:
Carloads.....80¢@15¢
1000 boxes or more Gulf Ports.....85¢
3000 boxes or more.....80¢@15¢@50¢@20¢
5000 boxes or more.....85¢

Glue—Liquid, Fish—

List A, Bottles or Cans, with Brush.
List B, Cans (½ pts., pts., qts.).....37¢@50¢
List C, Cans (½ gal., gal.).....33¢@45¢
Glue Pots—See Pots, Glue.

Grease, Axle—

Common Grade.....gro. \$5.00@6.00
Allerton's Axle:
15 Tins, 3 gr. \$9.00
3 ½ Tins, 3 doz., \$2.00; 5 ½, \$3.00;
10 ½, \$6.00.
25 ½ wood pails.....doz. \$12.00
Dixon's Everlasting.....10 ½ pails, ea. 85¢
Dixon's Everlasting, in bxs., doz. 1 ½
\$1.30; 2 ½ \$2.00

Grindstone Fixtures—

See Fixtures, Grindstone.
Gun Powder—See Powder.

Hack Saws—See Saws.**Hafts, Awi—**

Peg Patent, Leather Top.....gro. \$4.90@5.25
Peg Patent, Plain Top.....\$3.50@3.75
Seicing, Brass Ferrule.....\$1.50@1.60
Saddlers', Brass Ferrule.....\$1.35@1.45
Peg, Common.....\$1.25@1.35
Brad. Common.....\$1.50@1.75

Halters and Ties—

Covert Mfg. Co., Web.....45¢@2¢
Covert Mfg. Co., Jute Rope.....45¢@2¢
Covert Mfg. Co., Sisal Rope.....30¢@2¢
Covert's Saddlery Works, 36 list, W-b.....60¢@10¢
Covert's Saddlery Works, Leather.....60¢@10¢
Covert's Saddlery Works, Jute.....60¢@5¢
Covert's addlery Wo ks, Isal.....60¢
Covert's Saddlery Works, Manila.....60¢@5¢
Covert's saddlery Works, Cotton.....70¢

Hammers—

Handled Hammers—
Heller's Machinists'.....40¢@40¢
Magnetic Tack, Nos. 1, 2, 3, \$1.25, \$1.50,
\$1.75.
Peck, Stow & Wilcox.....40¢@40¢
Fayette R. Plumb:
Artisans' Choice, A. E. Nail.....33¢@35¢
Engineers' and B. S. Hand.....50¢@10¢
Machinists' Hammers.....50¢@10¢
A. E. & A. E. Bell Face Nail.....33¢@35¢
Riveting and Finners'.....33¢@35¢
Sargent's C. S. New List.....45¢@45¢@10

Heavy Hammers and Sledges—

3 lb. and under.....lb. 45¢
3 to 5 lb.....lb. 36¢-75¢@5¢
Over 5 lb.....lb. 30¢-10¢@5¢
Note.—Lower net prices sometimes
made by jobbers.
Wilkinson's Smith's.....9¢@10¢ lb.

Handcuffs and Leg Irons

See Police Goods.

Handles—

Agricultural Tool Handles—
Hoe, Rake, Fork, &c.....50¢@10¢@60¢
Shovel, &c., Wood D Handle.....50¢@50¢
Cross-Cut Saw Handles—
Atkins.....40¢
Champion.....45¢@45¢@10¢
Dixson.....50¢

Mechanics' Tool Handles—

Auger, assorted.....gro. \$2.40@3.80
Auger, large.....gro. \$2.85@3.00
Brad Axl.....gro. \$1.50@1.75

Chisel Handles:

Apple Tanged Firmer, gro. ass'd.
\$2.35@2.35; large, \$2.75@3.00.
Hickory Tanged Firmer, gro. ass'd.
\$1.75@2.25; large, \$2.35@2.50.
Apple Socket Firmer, gro. ass'd.
\$1.75@2.25; large, \$2.25@2.50
Hickory Socket Firmer, gro. ass'd.
\$1.60@1.75; large, \$1.75@2.00
Hickory Socket Framing, gro. ass'd.
\$2.50@2.75; large, \$2.65@2.85
File, assorted.....gro. \$1.00@1.15
Hammer, Hatchet, Axe, &c.....50¢@10¢
Hand Saw, Varnished, doz. 75¢@80¢
Not Varnished.....55¢@60¢
Plane Handles:
Jack, doz. 23¢@35¢; Jack Bolted.....
55¢@60¢
Fore, doz. 35¢@38¢; Fore, Bolted.....
70¢@75¢

Hangers—

Barn Door, New Pattern, Round
Groove, Regular:
Inch.....3 ½ 5 6 8
Doz.....\$1.10 1.15 1.20 2.00 2.75
Barn Door, New England Pattern,
Check Back, Round Groove, Regu-
lar:
Inch.....3 ½ 5 6
Doz.....\$1.50 2.00 2.60 3.25

Chicago Spring Butt Co.:

Friction.....25¢
Oscillating.....25¢
Big Twin.....25¢
Chisholm & Moore Mfg. Co.:
Advance.....55¢
Cleveland.....60¢
Baggage Car Door.....50¢
Elevator.....40¢
Railroad.....55¢
Czar Ball Bearing, 9 doz. pair \$3.50
No. 10 Roller Bearing, doz. pr. 5.50
No. 20 Roller Bearing, doz. pr. 4.50
Nickel.....50¢
J. G. C.....50¢@210¢
Lane Bros.:
Parlor, Standard.....40¢@21¢
Parlor, New Model.....40¢@21¢
Barn Door, Standard.....60¢@21¢
Covered.....50¢@10¢
Special.....60¢@5¢
Lawrence Bros.:
Crown.....60¢
New York.....60¢
Sterling.....60¢
McKinney Mfg. Co.:
No. 2, Standard, \$18.....60¢@10¢
No. 1, Special, \$13.....60¢@10¢
Stowell Mfg. and Foundry Co.:
Badger.....60¢
Baggage Car Door.....33¢
Climax Anti-Friction.....40¢
Elevator.....40¢
Interstate.....50¢@10¢
Matchless.....50¢@10¢
Nausen.....50¢@10¢
Parlor Door.....50¢
Railroad.....50¢@10¢
Street Car Door.....50¢@10¢
Steel, Nos. 300, 400, 500.....40¢@15¢
Wild West.....50¢@5¢
Zenith for Wood Track.....50¢@10¢
Taylor & Boggs Foundry Co.:
Kiddier's.....50¢@50¢@10¢
Van Wagoner & Williams Hdw. Co.:
American Trackless.....33¢@1 ½¢
Wilcox Mfg. Co.:
Bike Roller Bearing.....60¢@10¢
C. J. Roller Bearing.....60¢@10¢
Cycle Ball Bearing.....50¢
L. T. Roller Bearing.....60¢@10¢
New Era.....50¢@10¢
New Richards.....60¢
O. K. Roller Bearing.....60¢@10¢
Prindle Improved.....60¢@10¢
Richards' Improved.....60¢@10¢
Richards' Single Track.....50¢@10¢
Wilcox Dwarf Roller Bearing.....40¢@10¢
Wilcox Ives.....60¢@10¢
Wilcox Tandem Roller Bearing.....60¢@10¢
Wilcox Trolley Ball Bearing.....40¢
Wilcox Trolley Roller Bearing.....50¢
Wilcox Trolley Roller Bearing,
Fire.....40¢@10¢

Harness Menders—See Menders.**Harness Snaps—See Snaps.****Hasps—**

McKinney's Perfect Hasp, 9 doz. \$1.10
40¢@10¢
Wrought Hasps, Staples, &c.—See
Wrought Goods.

Hatchets—

Best Brands.....40¢@10¢@50¢
Cheaper Brands.....50¢@10¢@50¢@10¢
Note.—Net prices often made.

Hay and Straw Knives—

See Knives.

Hinges—**Blind Hinges—**

Lull & Porter Old Style Shutter:
No.....1 ½ 2 2 ½
Doz. pair.....\$0.70 .65 .60 .53
1868 Old Pattern Blind Hinge:
No.....1 3 5
Doz. pair.....\$0.30 1.45 2.25

Parker.....70¢@75¢

North's Automatic Blind Fixtures, No. 2,
for Wood, \$9.00; No. 3, for Brick,
\$11.50
Reading's Gravity.....75¢@10¢
Sargent's, Nos. 1, 3, 5.....60¢@10¢
Sargent's, Nos. 11 & 13.....7 ½ @70¢@10¢@10¢

Wrightville Hardware Co.:

Acme, Lull & Porter.....65¢@10¢@5¢
Buffalo Gravity Locking, No. 1, 3
and 5.....65¢@10¢@10¢
Champion Gravity Locking, No. 75, 75¢
1868, Old Pat'n, Nos. 1, 3 & 5.....70¢
Tip Pattern, Nos. 1, 3 and 5.....75¢
Double Locking, Nos. 20 and 25.....70¢
Empire, Nos. 101 and 103.....65¢@10¢
Niagara Gravity Locking, Nos. 1, 3
and 5.....65¢@10¢@10¢
Noiseless, Nos. 56, 60, 65 and 55.....65¢@10¢
O. S. Lull & Porter.....65¢@10¢@5¢
Pioneer, Nos. 060, 45 and 51.....65¢@10¢@5¢
Steamboat Gravity Locking, No. 10.....75¢
Stanley's Steel Gravity Blind Hinges,
9 doz. sets \$1.20.....20¢@10¢

Gate Hinges—

Clark's or Shepard's—Doz. sets:
No.....1 3 5
Hinges with Latches \$1.90 2.50 4.25
Hinges only.....1.30 1.55 3.30
Latches only.....0.70 0.70 1.30
New England:
With Latch.....doz. \$1.75@1.80
Without Latch.....doz. \$1.40@1.45
Reversible Self-Closing:
With Latch.....doz. \$1.65@1.75
Without Latch.....doz. \$1.30@1.35
Western:
With Latch.....doz. \$1.60@1.65
Without Latch.....doz. \$1.00@1.05

Spring Hinges—

Holdback, Cast Iron.....gro. \$7.00@7.50
Non-Holdback, Cast Iron.....gro. \$6.00@6.50

J. Bardsley:

Bardsley's Patent Checking.....10¢
Bommer Bros.:
Bommer's.....40¢
Chicago Spring Butt Co.:
Chicago.....25¢
Garden City Engine House.....25¢
Keene's Saloon Door.....25¢
Coleman Hdw. Co.:
Champion Holdback.....9 gr. \$0.00
J. G. C.....9 gr. \$0.00
Nickel.....9 gr. \$0.00
Lawson Mfg. Co.:
Matchless.....25¢
Matchless Pivot.....40¢
Payson Mfg. Co.:
Oblique, Dbl. Acting.....50¢@30¢@5¢
Stover Mfg. Co.:
Ideal, No. 18, Detachable, 9 gr. \$12.50
Ideal, No. 4.....9 gr. \$0.00
New Idea No. 1.....9 gr. \$0.00
New Idea, Double Acting.....45¢
Van Wagoner & Williams Hdw. Co.:
Acme.....30¢
Columbia, No. 14.....9 gr. \$8.00
Columbia, No. 18.....9 gr. \$24.00
Crown.....30¢
Gem.....30¢
Knoxall.....9 gr. \$0.00
Oxford.....30¢

Wrought Iron Hinges—

Strap and T Hinges, &c., list Mar.
15, 1898:
Light Strap Hinges.....66¢@
Heavy Strap Hinges.....70¢
Light T Hinges.....50¢@10¢
Heavy T Hinges.....60¢@10¢
Extra Heavy T Hinges.....66¢
Hinge Hasps.....45¢
Stanley's Corrugated Heavy
Strap.....70¢
Stanley's Cor. Ex. Heavy T.....70¢

Note.—Change in base discounts.

Rolled Plate.....70¢@70¢@5¢

Screw Hook.....6 to 12 in., lb. 3 ½ @3 ¾¢

and Strap.....22 to 36 in., lb. 3 @3 ¾¢

Screw Hook and Eye.....1 ¼ in., lb. 5 ½ @5 ¾¢

¾ in., lb. 6 ½ @6 ¾¢

½ in., lb. 8 ½ @8 ¾¢

Hoes— Eye—

Scovill and Oval Pattern.....60¢@50¢@60¢@10¢@5¢

Grub. list Feb. 23, 1899.....65¢@65¢@10¢

D. & H. Scovill.....35¢@35¢@5¢

Handled—

Aug. 1, 1899, List:

Field and Garden.....75¢@2¢

Ladies', Boys', Toy and Onion.....70¢@10¢@10¢

Street and Mortar.....75¢@7 ½ @2¢

Cotton.....70¢@10¢@10¢@5¢@2¢

Planters'.....70¢@30¢

Weeding.....75¢

Note.—Manufacturers and jobbers use
a diversity of lists, and often sell at net
prices

Ft. Madison Crucible Garden Hoe.....75¢@2¢

Ft. Madison Crescent Cultivator Hoe,
per doz.....75¢@10¢@2¢

Ft. Madison Mattock Hoe, 9 doz. \$4.50

Ft. Madison Sprouting Hoe, 9 doz. \$4.80

Ft. Madison Dixie Tobacco Hoe.....75¢@20¢

Kretzinger's Cut Easy, per doz.....75¢@20¢

Warren Hoe.....60¢

Hog Rings and Ringers—

See Rinos and Ringers.

Hoisting Apparatus—

See Machines, Hoisting.

Hollow Ware—

See Ware, Hollow.

Holders—

Bit—

Angular, 9 doz. \$24.00.....45¢@10¢

File and Tool—

Nicholson File Holders and File Han-
dles.....33¢@45¢

Hooks—**Cast Iron—**

Bird Cage, Reading.....50¢@10¢@60¢
Bird Cage, Sargent's List.....35¢@10¢
Clothes Line, Sargent's List.....40¢@40¢@10¢
Clothes Line, Stowell's.....70¢
Clothes Line, Reading List.....65¢@10¢@5¢@10¢@10¢

Coat and Hat, Stowell's.....70¢

Coat and Hat, Reading.....70¢@75¢

Coat and Hat, Sargent's List.....35¢@10¢

Coat and Hat, Wrightville.....65¢@10¢

Harness, Reading List.....70¢@10¢@75¢

Wire—

Belt.....20¢@30¢@10¢

Atlas Coat and Hat.....50¢@50¢@10¢

Cear Harness.....50¢@10¢

Wire Coat and Hat:
Acme.....60¢@60¢@5¢

B. B.....70¢@70¢@5¢

V Brace, Chief and Czar.....50¢@10¢

Gem.....50¢@10¢

Bright Wire Goods—See Wire.

Wrought Iron—

Box, or Case, Octagon Steel.....doz. \$2.10@2.20

Cotton.....doz. \$1.05@1.15

Picture, T. & S. Mfg. Co.....75¢

Truss, T. & S. Mfg. Co.....50¢@10¢

Wrough. Staples, Hooks, &c.—See Wrought Goods.

Miscellaneous—
Brush, Light, doz. \$5.50; Medium,
\$6.00; Heavy, \$6.50
Grass.....Nos. 1 2 3 4
Best.....\$1.60 1.75 2.00
Common.....\$1.50 1.50 1.50 1.75
Potato and Manure.....75¢@15¢
Whiffletree.....lb. 4 ¾¢
Hooks and Eyes:
Brass.....10¢@10¢@10¢@70¢
Malleable Iron.....70¢@5¢@70¢@10¢

Covert Saddlery Works' Self Locking

Gate and Door Hook.....60¢@10¢
Crown Picture.....50¢@10¢
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—See Nails, Horse**Horseshoes—**

See Shoes, Horse.

Hose, Rubber—

Garden Hose, ¾-inch:
Competition.....ft. 1 ¾ @ 5 ¼¢
3-ply Standard.....ft. 5 ¼ @ 6 c
4-ply Standard.....ft. 6 ¼ @ 6 ¾¢
3-ply extra.....ft. 6 ¼ @ 7 ¼¢
4-ply extra.....ft. 7 ¼ @ 8 ¼¢
High Grade.....ft. 9 @ 11 c
Cotton Garden, ¾-in., coupled:
Low Grade.....ft. 5 ¼ @ 6¢
Fair quality.....ft. 7 c
Good quality.....ft. 8 @ 8 ¾¢

Irons—

From 4 to 10.....lb. 3 ¼ @3 ½¢

B. B. Sad Irons.....lb. 3 ½ @4¢

Chinese Laundry.....lb. 5 @5 ¼¢

Chinese Sad.....lb. 3 ¼ @4¢

Mrs. Potts', per set:
Nos. 50 55 60 65
85¢@1.00 78¢@93¢ 95¢@1.10 89¢@1.03

New England Pressing, lb. 3 ¼ @3 ½¢

Soldering—

Soldering Coppers.....lb. 28¢@30¢

Covert Mfg. Co.....20¢@24¢

Pinking—

Pinking Irons.....doz. 50¢@60¢

Jack Screws—See Screws.**Jacks, Wagon—**

Covert Mfg. Co., Steel.....45¢@2¢

Daisy.....70¢

Ill. I. & B. Co. Common.....70¢@75¢

Lockport.....40¢@40¢@10¢

Victor.....60¢

Lane's Steel.....33 ¾¢

Kettles—

Brass, Spun, Plain, list Jan. 10, '99
15¢@20¢

Enameled and Tea—See Ware, Hollow.

Knife Sharpeners—

See Sharpeners, Knife.

Knives—**Butcher, Shoe, &c.—**

Dick's Butcher Knives.....40¢

Foster Bros. Butcher, &c.....30¢

Nichols' Butcher Knives.....50¢

Hay and Straw—See Hay Knives.

Corn—

Ft. Madison Cut-Easy, 9 doz. \$3.25

Drawing—

Standard List.....75¢@5¢@75¢@10¢

Adjustable Handle.....25¢@33 ¾¢

Bradley's.....35¢

Swan's.....70¢@10¢@2 ¼¢

Watrous.....30¢@10¢@40¢

L. & J. White.....20¢@5¢@25¢

Cautelo's Folding.....50¢@50¢@5¢

Hay and Straw—

Ritzhard.....\$5.75@6.00

Iwan's Sickle Edge.....9 doz. \$11.50

Lightning.....\$7.50

Mincing—

Buffalo.....9 doz. \$15.00

Smith's, 9 doz., Single, \$2; Double, \$3
45¢@50¢

Miscellaneous—

Farriers'.....doz. \$2.00@3.00

Wostenholme's.....9 doz. \$3.00@3.25

Lemon Squeezers—

See Squeezers, Lemon.

Lifters, Transom—

Dickson:

3 x 4 ft. x 1/2"	\$100	\$11.00
Other sizes Iron	70¢	10¢
Other size, Brass and Bronze	70¢	
Excelsior	60¢	80¢
Payson's:		
Solid Grip Nos. 613 and 614	\$103	
Bronzed Iron	70¢	

Lines—

Wire Clothes, Nos. 18 19 20		
100 feet	\$2.75	\$2.50
75 feet		\$1.50
Ossawa Mills:		
Crown Solid Braided Chalk	83¢	
Mason's, No. 0 to No. 3	83¢	
Silver Lake Braided Chalk, No. 0, \$6.00;		
No. 1, \$6.50; No. 2, \$7.00; No. 3, \$7.50		
per gr.		80¢

Locks, &c.— Cabinet—

Cabinet Locks.....83¢@85¢@7½¢

Door Locks, Latches, &c.—

[Net prices are very often made on these goods.]

Reading Hardware Co.	40¢
R. & E. Mfg. Co.	42¢
Sargent & Co.	40¢
Slaymaker-Barry Co.	30¢
Snow's Victor	50¢

Elevator—

Stowell's.....83¢

Padlocks—

Wrought Iron, list Dec. 3, '97.....70¢@70¢@10¢

Dog Collar, S. B. Co.....40¢

R. & E. Mfg. Co. Wrt Steel a d brass.....50¢

S. B. & Co.....40¢

Sash, &c.—

Fitch's Bronze and Brass.....60¢

Fitch's Iron.....70¢

Lives Patent.....62½¢@10¢@60¢@10¢

Payson's Perfect.....70¢

Payson's Signal (new list).....75¢

Reading.....60¢@10¢@10¢@70¢

Machines—**Boring—**

Without Augers.

Upright. Angular.

Improved No. 3.....\$4.25 No. 1 \$5.00

Improved No. 4.....\$5.75 No. 2 \$3.38

Improved No. 5.....\$2.75 No. 3 \$3.38

Jennings'.....2.50

Miller's Falls.....4.75

Snell's, Rice's Pat. 2.50

Swan's, No. 500.....6.10 No. 200 6.45

Hoisting—

Moore's Anti-Friction Differential Pul-

ley Block.....30¢

Moore's Hand Hoist, with Lock Brake.....30¢

Washing—

Wayne American, per doz. \$27.00

Western Star, No. 2, per doz. 28.00

Western Star, No. 3, per doz. 30.00

St. Louis, No. 41, per doz. 60.00

Carlton
lots 10¢ off,
freight at
lowest.**Mallets—**

Hickory.....45¢@50¢@55¢

Lignum vitae.....55¢@50¢@55¢

Timbers, Hickory and Applewood,
doz.....50¢@55¢

Fiber Head Stearns'.....83¢@10¢

Mats—**Door—**

Elastic Steel (W. G. Co.).....10¢

Mattocks—

List Feb. 23, 1899.....65¢@65¢@10¢

Meat Cutters—

See Cutters, Meat.

Milk Cans—See Cans, Milk.**Mills—Coffee—**

Box and Side, list Jan. 1, '98.....60¢@50¢@10¢@5¢

Net prices are often made on some
goods which are lower than above
discounts.

Enterprise Mfg. Co., list Jan. 17, '93.....30¢

National, list Jan. 1, '94.....30¢

Parker's Columbia and Victor.....60¢@10¢

Parker's Upright.....30¢@10¢@40¢

Swift, Lane Bros.....30¢

Mincing Knives—

See Knives, Mincing.

Molasses Gates—

See Gates, Molasses.

Money Drawers—

See Drawers, Money.

Mowers, Lawn—

Net prices are generally quoted.

10 12 14 16-inch

Cheap.....\$1.75@2.00

Good.....3.00 3.25 3.50 3.75

High Grade 4.00 4.25 4.50 4.75

Pennsylvania and Continental 60¢@10¢@5¢

Quaker City.....70¢@5¢

Great American.....70¢@5¢

Philadelphia:

Styles M. S. C. K. T.	70¢@10¢
Style A, all Steel	60¢@10¢
Style E, Low Wheel	60¢@10¢
Style E, High Wheel	70¢@10¢
Drexel and Gold Coin, low list	50¢

Nails—

Cut and Wire See Trade Report.

Wire Nails and Brads, Papered.

List July 20, 1899.....80¢@80¢@10¢

Hungarian, Finishing, Upholster-

ers, &c. See Tacks.

Horse—

Nos. 6 7 8 9 10

A. C.....25¢ 23¢ 22¢ 21¢ 20¢

Capewell.....19¢ 18¢ 17¢ 16¢ 15¢

C. B. K.....25¢ 23¢ 22¢ 21¢ 20¢

Champion.....28¢ 26¢ 25¢ 24¢ 23¢

Maud S.....25¢ 23¢ 22¢ 21¢ 20¢

Neponset.....23¢ 21¢ 20¢ 19¢ 18¢

Putnam.....23¢ 21¢ 20¢ 19¢ 18¢

Standard.....23¢ 21¢ 20¢ 19¢ 18¢

Star.....23¢ 21¢ 20¢ 19¢ 18¢

Vulcan.....23¢ 21¢ 20¢ 19¢ 18¢

83¢@5¢

Picture—

1½ 2 2½ 3 3½ in.

Brass Head.....45¢ 60¢ 70¢ 95¢ 1.00 gro.

Por. Head.....1.10 1.10 1.10 .. gro.

Nippers, See Pliers and Nippers.**Nut Crackers—**

See Crackers, Nut.

Nuts—

List Feb. 1, '99.

Cold Punched.

Mfrs. or U. S. Standard. list.

Hexagon, plain.....\$2.90@4.10

Square, plain.....\$2.90@4.10

Square, C. T. & R.....\$2.70@3.90

Hexagon, C. T. & R.....\$2.40@4.40

Hot Pressed:

Mfrs., U. S. or Nar. Gauge Stan'd.

Square.....\$4.30@4.50

Hexagon.....\$4.50@4.70

NOTE.—Tapped Nuts are now 2-40c.

higher than above.

Oakum—

Best or Government.....lb. 54¢

Navy.....lb. 44¢

U. S. Navy.....lb. 54¢

Plumbers' Spun Navy.....24¢

In carload lots 14¢ lb. off f.o.b. New

York.

Oil Tanks—See Tanks, Oil.**Oilers—**

Brass and Copper.....10¢@10¢@50¢

Tin or Steel.....60¢@10¢@10¢@70¢@5¢

Zinc.....60¢@10¢@10¢@60¢

Malleable, Hammers' Improved, No. 1

\$3.60; No. 2, \$4; No. 3, \$4.40 per doz. 20¢

Malleable, Hammers' Old Pattern

same list.....50¢@10¢

Wilmet & Hobbs Mfg. Co.....70¢@70¢@10¢

Openers, Can—

French.....doz. 85¢

Iron Handle.....doz. 25¢@27¢

Sprague, Iron Hdle. per doz. 35¢@40¢

Sardine Scissors.....doz. \$1.75@3.00

National, per gro.....\$1.75@2.00

Stowell's.....per d. z. 40¢@45¢

Packing—**Rubber—**

Standard, fair quality.....70¢@10¢@75¢

Inferior quality.....75¢@10¢@80¢

Extra.....60¢@50¢@40¢@10¢@5¢

Jenkins' Standard, per doz. 25¢@25¢@5¢

Miscellaneous—

American Packing.....9¢@10¢ lb.

Cotton Packing.....13¢@14¢ lb.

Italian Packing.....10¢@11¢ lb.

Jute.....5¢@5¢ lb.

Russia Packing.....12¢@13¢ lb.

Pails—**Creamery—**

S. S. & Co., with gauges.. No 1 \$3.50;

No. 2, \$6.75 per doz.

Galvanized—

Inch.....10 12 14

Water, Standard.....\$23.00 \$26.00 \$29.00

Water, Regular.....19.00 22.00 25.00

Water, Heavy.....22.00 25.00 28.00

Fire, Rd. Bottom.....51.00 53.00 55.00

Well, gro.....27.00 29.00 31.00

Pans—**Dripping—**

Large Sizes.....lb. 4½¢

Small Sizes.....lb. 5½¢

Fry—

Standard List.....75¢@10¢@80¢

Roasting and Baking—

Regal, S. S. & Co., per doz. Nos. 5, \$4.50;	
10, \$5.00; 20, \$5.50; 30, \$6.00	
Simplex, per gro. No. 40, \$30.00; 50,	
\$34.50; 60, \$39.00; 140, \$38.00; 150,	
\$37.50; 160, \$43.00.	

Paper—**Building Paper—**

Per roll

Rosin Sized Sheathing: 500 sq. ft.

Light wt., 20 sq. ft. to lb. \$0.40@0.45

Medium wt., 12 sq. ft. to lb.

Heavy wt., extra quality, \$0.95@1.05

Medium Grades Water Proof

Sheathing.....\$0.80@1.25

Deafening Felt, 9, 8 and 1½ sq. ft.

to lb., ton.....\$45.00@50.00

York Haven Waterproof Sheathing.....

\$1.35@1.75

Tarred Paper.

1 ply (roll 500 sq. ft.), ton, \$35.00@40.00

2 ply, roll 100 sq. ft.....90¢

3 ply, roll 100 sq. ft.....\$1.20

Sand and Emery—

List April 19, 1886, 50¢@10¢@50¢@10¢@10¢

Parers—**Apple—**

Advance.....per doz. \$4.50

Baldwin.....per doz. \$5.00

Bonanza.....each \$5.00

Dandy.....each \$7.50

Eureka, 1898.....each \$10.00

Family Bay State.....per doz. \$12.00

Hudson's Little Star.....per doz. \$4.00

Hudson's Rocking Table.....per doz. \$5.50

Improved Bay State per doz. \$37.00@30.00

New Lightning.....per doz. \$3.50

Reading 72.....per doz. \$4.00

Reading 78.....per doz. \$7.00

Turn Table 78.....per doz. \$5.50

White Mountain.....per doz. \$4.00

Potato—

Saratoga.....per doz. \$5.50

White Mountain.....per doz. \$4.50

Picks and Mattocks—

List Feb. 23, 1899.....65¢@65¢@10¢

Pinking Irons—

See Irons, Pinking.

Pine—**Escutocheon—**

Brass.....60¢@60¢@5¢

Iron, list Nov. 11, '85.....60¢@60¢@5¢

Pipe, Cast Iron Soil—

Factory Shipments.

Standard, 2-6 in.....50¢@50¢@10¢

Extra Heavy, 2-6 in.....50¢@10¢@60¢

Fittings.....60¢@60¢@10¢

Pipe, Wrought Iron—

Factory Shipments.

List February, 1899.

Plain and Galvanized:

Carload lots.....60¢@10¢@10¢

Less than carload lots.....50¢@10¢@5¢

Screw and Socket Casing.....\$7½¢@5¢

Inserted Joint Casing.....\$7½¢@5¢

Cold Drawn Seamless Steel Tubing.....

60¢

Planes and Plane Irons—**Wood Planes—**

Molding.....40¢@2½¢@40¢@5¢

Bench, First quality.....45¢@10¢@45¢@10¢@5¢

Bench, Second quality.....50¢@10¢@50¢@10¢@5¢

Bailey's (Stanley R. & L. Co.).....

50¢@10¢@10¢@50¢@10¢@10¢@10¢

Gage Self Setting.....35¢

Iron Planes—

Bailey's (Stanley R. & L. Co.).....

50¢@10¢@10¢@50¢@10¢@10¢@10¢

Chaplin's Iron Planes.....60¢@10¢

Miscellaneous Planes (Stanley R. & L.

Co.).....25¢@10¢@10¢@45¢@10¢@10¢@10¢

Sargent's.....50¢@10¢@60¢

Plane Irons—

Wood Bench Plane Irons.....50¢@10¢

Buck Bros.....30¢

Butcher's.....\$5.00@5.25 to 2

Stanley R. & L. Co.....50¢@10¢@50¢@10¢@10¢

Pulleys—

Hay Fork, Steel or Solid Eye	doz. \$1.60@2.00
Hay Fork, Stowell's Anti-Friction, 5-in. Wheel, # doz. \$12.00	40%
Hot House, Awning, &c.	80@100
Japanned Clothes Line	60@100
Japanned Screw	70@100
Japanned Side	70@100
Stowell's Ceiling or End, Anti-Friction 60%	
Stowell's Dumb Walter, Anti-Friction	60@100
Stowell's Electric Light	60%
Stowell's Side, Anti-Friction	60@100
Sash (Auger Mortise):	
Common Sense, 1 1/2 in., # doz. 20¢	
2 in., 22¢	
Empire	1 1/2 in., 17¢; 2 in., 19¢
I. C.	1 1/2 in., 15¢; 2 in., 17¢
Ideal No. 13	1 1/2 in., # doz. 20¢
Improved	1 1/2 in., 17¢; 2 in., 19¢
Niagara	1 1/2 in., 16¢; 2 in., 19¢
No. 28, Troy	1 1/2 in., 16¢; 2 in., 19¢
Star	1 1/2 in., 16¢; 2 in., 19¢
Acme	1 1/2 in., 16¢; 2 in., 19¢
Tackle Blocks—See Blocks	

Pumps—

Cistern	60@100
Pitcher Spout	70@100
Pump Leathers, all sizes	gro. \$5.00
Flint & Walling's Fast Mail	50@55
Flint & Walling's Pitcher Spout	70@100
Loud's Suction Pumps, U. H. Co.	20%
Myer's Pumps, low list	50%
Contractors' Rubber Diaphragm Non-chokable, B. & L. Block Co.	30%

Punches—

Revolving (4 tubes)	doz. \$3.50@3.75
Saddling or Drive, good	doz. 65@70c
Spring, good quality	\$1.70@1.80
Bemis & Call Co.'s Cast Steel Drive	50@55
Bemis & Call Co.'s Check	55%
Bemis & Call Co.'s Spring	60@65
Niagara Hollow Punches	45%
Niagara Solid Punches	55%
Spring, Leach's Pat.	15%
Steel Screw, H. & K. Mfg. Co.	40%
Tinners' Hollow, P. S. & W. Co.	35@37.5%
Tinners' Solid, P. S. & W. Co.	# doz. \$1.44

Rail—**Barn Door, &c.—**

Barn Door, Light, In. 1/2 3/4 8 1/2	
100 feet	\$2.00 \$2.50 \$3.00
B. D., for N. E. Hangers:	
Small Med. Large	
100 feet	\$2.20 \$2.70 \$3.20
Sliding Door, Bronzed Wrt Iron	ft. 64c
Sliding Door, Iron Painted	2 1/2@3c
Sliding Door, Wrought Brass, 1 1/2 in.	lb. 38c-30%
Cronk's Double Braced Steel Rail	3 1/2c
Lanes' O. N. T., # 100 ft., 1 inch	\$3.00
Lanes' Standard, # 100 ft.	4.35
McKinney's None Better	# ft. 3c
McKinney's Standard	# ft. 3 1/2c
Moore's, Wrt. Bracket, Steel	3 1/2c
Stowell's Steel Rail, Plain	10%

Rakes—

Aug 1, 1899, List:	
Cast Steel	70@85c
Malleable	60@65
Fort Madison Red Head Lawn	\$3.25
Fort Madison Blue Head Lawn	\$3.00

Rasps, Horse—

Disston's	75%
Heller Bros.	60@100
New Nicholson Horse Rasp	70@100
See also Files	

Razor Stroops—

See Stroops, Razor.

Reels—**Fishing—**

Hendryx Aluminum, German Silver, Gold, Bronze, Silver, Rubber, Poplar and Salmon, Single Action, Multiplying and Quadruple, all sizes	25%
Hendryx Single Action Series, 102P and PN, 202P and PN, 102 PR and PN, 202 PR and PN, 304 P and PN, 00304P and PN, 502 and 502N, 802 and 802N, 02084N, Competitor	50%
Hendryx Multiplying and Quadruple Series, 3004N and PN, 4N and PN, 8004N, 2004P and PN, 002904P and PN, 0924 and 0924N, 5009N and PN	40@10%

Registers—

For points on Mississippi River and East:	
Black Japanned	20@10%
White Japanned	30@10%
Bronzed Finishes	30%
Nickel Plated	30@10%
Electro Plated in Brass, &c.	30@10%
White Porcelain	20%
Solid Brass and Bronze Metal	20%
Note—Higher prices are quoted in territory further West	

Rings and Ringers—**Bull Rings—**

Steel	2 1/2 3 1/2 4 1/2
5	0.75 0.83 0.88
Copper	1.10 1.30 1.50

Hog Rings and Ringers—

Hill's Rings	gro. boxes, \$1.50@2.00
Hill's Ringers, G. L.	doz. 75c
Blair's Rings	# gr. \$5.75@6.00
Blair's Ringers	# doz. \$0.90@1.00
Brown's Rings	# gro. \$0.90@1.25
Brown's Ringers	# doz. \$1.00@1.10
Perfect Rings	# gro. \$0.80@0.90
Perfect Ringers	# doz. \$1.25@1.35

Rivets and Burrs—

Copper	40@100
Iron or Steel	
Tinners'	52 1/2@57 1/2
Miscellaneous	52 1/2@53 1/2

Rivet Sets—See Sets.**Roasting and Baking Pans—See Pans, Roasting and Baking.****Rollers—**

Acme, Stowell's Anti-Friction	50%
Barn Door, Sargent's list	60@100
Lane's, Stay	33 1/2@35
Stowell's Barn Door Stay	# doz. \$1.25

Repe—

Manila, 7-16 in. and larger	
Manila	lb. @ 15 1/2c
Manila, 1/4 and 5-16 in. lb.	@ 16 c
Manila, Tarred Rope, 15 thread	lb. @ 15 1/2c
Manila Hay Rope Med'm lb.	@ 15 1/2c
Sisal, 7-16 in. and larger, lb.	@ 10 1/2c
Sisal	lb. @ 11 c
Sisal, 1/4 and 5-16 in. lb.	@ 11 1/2c
Sisal, Hay Rope, # to 10 ply	lb. @ 10 1/2c
Sisal, Tarred, Medium	
Lath Yarn	lb. @ 10 c
Cotton Rope:	
Best, 1/4-in. and larger, lb.	13 @ 14 c
Med'm, 1/4-in. and larger	lb. 10 @ 12 c
Com., 1/4-in. and larger, lb.	8 @ 10 c
Jute Rope, No. 1, 1/4 in. and up	lb. @ 7 c
Jute Rope No. 2, 1/4 in. and up	lb. @ 6 1/2c
Note—Carload lots, except on Jute Rope, 1/4c. per lb. least than above.	

Wire Rope—

List July 1, '99	30@37 1/2
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Ropes, Hammock—

Covert Mfg. Co.	45@25
Covert Saddlery Works	60%

Rules—

Boxwood, .75@1.00@1.00@1.00@1.00@1.00	
Ivory	40@100
Lufkin's Steel	50@100
Lufkin's Lumber	50@100
Stanley & L. Co.	50@100
Boxwood	75@100
Ivory	40@100

Sad Irons—See Irons, Sad.**Sand and Emery Paper and Cloth—See Paper and Cloth.****Sash Cords—See Cord, Sash.****Sash Locks—See Locks, Sash.****Sash Weights—See Weights, Sash.****Sausage Stuffers or Fillers—See Stuffers or Fillers, Sausage.****Saw Frames—See Frames, Saw.****Saw Sets—See Sets, Saw.****Saw Tools—See Tools, Saw.****Saws—**

Note—Extra 5% often given on Circulars, Cross Cuts, &c., and extra 5@7 1/2 on Hand, Butcher, &c.	
Atkins' Circular	50%
Atkins' Band	50%
Atkins' Cross Cuts	40%
Atkins' Mulay, Mill and Drag	50%
Atkins' One-Man Saw	40@100
Atkins' Wood Saws	40@100
Atkins' Hand, Compass, &c.	40%
Disston Circular Band and Liscure	50%
Disston Band 2 to 14 in. wide	60%
Disston Band 1/4 to 1 1/2 in.	70%
Disston Crosscuts	50%
Disston Narrow Crosscuts	55%
Disston Mulay, Mill and Drag	50%
Disston Framed Woodsaws	35%
Disston Woodsaw blades	40%
Disston Woodsaw Rols	25%
Disston Hand-saws, Nos. 12, 99, 9 1/2, 1100, D4, 120, 79, 77, 8	25%
Disston Hand Saws, Nos. 7, 107, 10 1/2, 8, 1, 0, 90, Combination	30%
Disston Compass, Keyhole, &c.	25%
Disston Butcher Saws and H. axes	35%
C. E. Jennings & Co.'s	25@35
Peace Circular and Mill	50%
Peace Cross Cuts, list Jan. 1, '99	30%
Peace Hand, Panel and Rip	30%
Richardson's Circular and Mill	50%
Richardson's X Cuts, list Jan. 1, '93	45@100
Richardson's Hand, &c.	50%
Simonds' Circular Saws	50%
Simonds' Crescent Ground Cross Cut Saws	35%
Simonds' One-Man Cross Cuts	40@100
Simonds' Gang Mill, Mulay and Drag Saws	15@45

Hack Saws—

Disston Circular Blades	25%
Disston Keyhole	30%
Disston Hack Saw Frames	30%
Griffin's complete	30@50
Griffin's Hack Saw Blades	50@50 1/2
Star Hack Saws and Blades	15@10%

Scroll—

Barnes' No. 7	\$15
Barnes' Scroll Saw Blades	25%
Barnes' Velocipede Power Scroll Saw, without boring attachment	\$18
with boring attachment	\$20
Lester, complete	\$10.00
Rogers, complete	\$4.00

Scale Beams—

See Beams, Scale.

Scales—

Family, Turnbull's	30@30 1/2
Hatch, Counter:	
Platform, 4 lb. by 1/4 oz.	doz. \$5.75
Two Platforms, 8 lb. by 1/4 oz.	doz. \$16.00
Union Platform, Plain	\$2.00@2.25
Union Platform, Striped	\$2.15@2.25
Chatillon's Eureka	25%
Chatillon's Favorite	40%
Chatillon's Grocers' Trip Scales	50%
Pelouze Scales—Family, Candy, Grocers' and Postal	New list net
"The Standard" Portables	45%
"The Standard" R. R. and Wagon	50%

Scrapers—

Box, 1 Handle	doz. \$2.25@2.75
Box, 2 Handle	doz. \$3.75@4.00
Ship, No. 1, doz.	\$3.50; No. 2, \$2.25@2.40
Adjustable Box Scraper (S. R. & L. Co.)	\$8.00
Foot, W. E. Pratt Mfg. Co.	# doz. \$1.15@1.25

Screen Window and Door Frames—See Frames.**Screw Drivers—**

See Drivers, Screw.

Screws—

Bench, Iron, doz. 1 in.	\$2.50@2.75
1 1/2, \$2.85@3.10; 1 3/4, \$3.85@3.50	
Bench, Wood, Beech, doz.	\$3.50@3.75
Hand, Wood	35@40%
Hand, Grand Rapids	35%

Coach, Lag and Hand Rail—

Lag, Common Point, list Oct. 1, '99	60@65
Coach and Lag, Gimlet Point, list Oct. 1, '99	65@68
Hand Rail, list Jan. 1, '81	82 1/2@85

Jack Screws—

Millers Falls	50@100
Millers Falls, Roller	50@100
P. S. & W.	40@50
Sargent	60@100

Machine—

List Jan. 1, '98	
Flat or Round Head, Iron	60%
Flat or Round Head, Brass	60%

Set and Cap—

Set (Iron or Steel)	60%
Sq. Hd. Cap	65%
Hex. Hd. Cap	60%

Wood—

List Nov. 10, 1898. Discounts adopted June 23, '99.	
Flat Head, Iron	90%
Round Head, Iron	75%
Flat Head, Brass	77 1/2%
Round Head, Brass	72 1/2%
Flat Head, Bronze	72 1/2%
Round Head, Bronze	70%
Drive Screws	82 1/2%

Note.—An extra 5 or 10% is often given.

Scroll Saws—See Saws, Scroll.**Scythes—****Scythe Snaths—**

See Snaths, Scythe.

Seeders—

Raisin	25@30%
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Sets—

Awl and Tool—	
Wood Hdl., 10 Awls doz.	\$2.00@2.25
Wood Hdl., 14 Awls, 6 Tools	doz. \$2.50@2.80

Alken's Sets, Aw and Tools:	
No. 20, # doz. \$10.00	60@100
Fray's Adj. Tool Hdl. dis., Nos. 1, 12; 2, 18; 3, 12; 4, 9; 5, 8	50%
Millers Falls Adj. Tool Hdl., No. 1, \$12; No. 4, \$12; No. 5, \$18	15@10%
Stanley's Excelsior	No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50
40@100	40@100

Garden Tool Sets—

Ft. Madison Rakes, Shovel and Hoe	# doz. \$9.00
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Nail—

Round, assorted	gro. \$3.25@3.75
Octagon	gro. \$4.25@4.75
Knurled, Good	gro. \$5.00@5.50

Buck Brothers	27 1/2%
Cannon's Diamond Point	# gr. \$13.25
Snell's Corrugated, Cup Pt.	50%
Snell's Knurled, Cup Pt.	66 1/2%

Rivet—

Regular list	70@70 1/2
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Saw—

Alken's Genuine	# doz. \$4.50@5.00
Alken's Imitation	# doz. \$4.00@4.50
Atkin's Criterion	# doz. \$3.00
Atkin's Adjustable	# doz. \$3.00
Bemis & Call Co.'s Cross Cut	30@50
Bemis & Call Co.'s Plate	20%
Bemis & Call Spring Hammer	30@50
Bemis & Call Mower ch.	25%
Hammer, Bemis & Call Co.'s new Pat.	45%

Morrill's No. 1	\$15.00
Nos. 3 and 4, Cross Cut	\$3.00
No. 5, Mill	\$31.00
No. 10	\$15.50
No. 11	\$16.00
Taintor Positive	# doz. \$18

Sharpeners, Knife—

Tanite Mills	# gross, \$14.40
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Shaves, Spoke—

Iron	doz. \$1.00@1.25
Wood	doz. \$1.75@2.25
Railley's (Stanley R. & L. Co.)	50@100
Goodell's	# doz. \$9.00

Shears—

Cast Iron	7 8 9 in.
Best	\$16.00 13.00 20.00
Good	\$13.00 15.00 17.00
Cheap	\$5.00 6.00 7.00

Straight Trimmers, &c.—

Best quality, Jap.	70@50
Nickel	60@50
Fair qual. Jap.	80@100
Nickel	75@50

Tailors' Shears—

Acme Cast Shears	40@40 1/2
Heinrich's Tailors' Shears	40@40 1/2
National Cutlery Co., Nicks	40@100
National Cutlery Co., En Hdl.	70@100
Seymour's, Jan.	70@70 1/2
Seymour's Nickel	60@60 1/2
Seymour's Tailors' Shears	40%
Wilkinson's Hedge	50%
Wilkinson's Sheep	15%

Tinners' Snips—

Shovels and Tongs—

Brass Head.....60¢50¢60¢10¢
 Iron Head.....70¢50¢60¢10¢

Sieves and Sifters—

Hunter's Imitation, gro. \$11.00@12.00
 Buffalo Metallic Blue, S. S. & Co., gr. gr. 14 1/2 16 1/2 18 1/2 20 1/2 22 1/2 24 1/2 26 1/2 28 1/2 30 1/2 32 1/2 34 1/2 36 1/2 38 1/2 40 1/2 42 1/2 44 1/2 46 1/2 48 1/2 50 1/2 52 1/2 54 1/2 56 1/2 58 1/2 60 1/2 62 1/2 64 1/2 66 1/2 68 1/2 70 1/2 72 1/2 74 1/2 76 1/2 78 1/2 80 1/2 82 1/2 84 1/2 86 1/2 88 1/2 90 1/2 92 1/2 94 1/2 96 1/2 98 1/2 100 1/2
 Electric Light.....gr. \$10.00
 Hunter's Genuine.....gr. \$12.50
 Shaker (Barber's Pat.) Flour Sifters.....gr. \$2.00

Sieves, Wooden Rim—

Mesh 18, Nested, doz.....\$0.75@0.80
 Mesh 20, Nested, doz......85@.90
 Mesh 24, Nested, doz.....1.00@1.05

Sinks—**Cast Iron—**

Low list.....65¢65¢5¢
 NOTE.—The low list is now generally used, but some jobbers use high list.

Wrought Steel—

Columbus Galv'd and Enamelled.....60¢5¢
 Columbia, Patented.....45¢
 L. & G.....59¢

Skeins, Wagon—

Cast Iron.....70¢70¢10¢
 Malleable Iron.....60¢13¢50¢
 Steel.....35¢35¢5¢
 L. I. & B. Co. Steel.....35¢

Slates—

"D" Slates.....50¢10¢50¢10¢10¢
 Unexcelled Noiseless Slates.....60¢6¢6¢6¢6¢
 Wire Bound.....60¢10¢50¢
 Double Slates, add \$1 case, net.

Slaw Cutters—See Cutters.**Snaps, Harness—**

German.....40¢40¢10¢
 Covert Mfg. Co.:
 Derry.....35¢2¢
 High Grade.....45¢2¢
 Jockey.....40¢2¢
 Trojan.....45¢2¢
 Covert's Saddlery Works:
 Banner.....60¢10¢
 Crown.....60¢10¢
 Triumph.....60¢10¢

W. & E. T. Hitch Co.:—

Bristol.....40¢10¢
 Empire.....50¢5¢
 National.....50¢5¢
 Clipper.....50¢5¢
 Champion.....40¢
 Victor.....60¢5¢
 Orel & Wm. H. T.:
 So d Steel.....65¢65¢10¢
 Sol. Swivel.....5¢6¢10¢10¢
 Bargent's Patent Guarded.....68¢68¢10¢

Snaths—

Scythe.....45¢5¢

Snips, Tinners'—See Shears.**Soldering Irons—**

See Irons, Soldering.

Spoke Trimmers—

See Trimmers, Spoke.

Spoons and Forks—**Silver Plated—**

Flat Ware.....60¢10¢60¢10¢
 Wm. Rogers Mfg. Co.....50¢10¢

Miscellaneous—

German Silver.....60¢10¢
 Wm. Rogers Mfg. Co.:
 185 German Silver.....60¢
 Rogers' Silver Metal.....50¢10¢

Springs—**Door—**

Gem (Coll).....20¢
 Star (Coll).....30¢
 Torrey's Rod, 39 in.....gr. \$1.10@1.25
 Warner's No. 1, gr. doz. \$1.50; No. 2, \$3.40.....55¢55¢10¢
 Victor (Coll).....60¢10¢60¢10¢5¢

Carriage, Wagon, &c.

1 1/4 in. and wider...Blk. Hf. Brt. Brt.
 Tested and Temp 5 1/4 5 1/4 6 1/4 lb
 Oil Tested and
 Tempered.....6 1/4 6 1/4 7 1/4 lb
 Cliff's Bolster Springs.....3¢
 Cliff's Seat Springs.....pair 55¢

Sprinklers, Lawn—

Enterprise.....25¢30¢
 Philadelphia No. 1, gr. doz. \$12; No. 2, \$15; No. 3, \$24.....30¢

Squares—

Nickel plated.....List May 1, '95.
 Steel and Iron.....70¢70¢5¢.
 Rosewood Hdl. Try Square and T-Bevels.....60¢10¢10¢70¢
 Iron Hdl. Try Squares and T-Bevels.....40¢10¢40¢10¢10¢
 Diaston's Try Sq. and T-Bevels.....60¢10¢
 Winterbottom's Try and Miter.....50¢10¢

Squeezers—**Lemon—**

Wood, Common, gro. No. 0. \$5.00;
 No. 1, \$6.50; No. 2, \$10.00.
 Wood, Porcelain Lined:
 Cheap.....doz. \$2.00@2.75
 Good Grade.....doz. \$3.00@3.50

Tinned Iron.....doz. \$0.80@1.25
 Iron, Porcelain Lined doz. \$3.25@3.50
 Jennings' Star.....gr. doz. \$1.85@1.90
 King.....gr. doz. \$2.00

Staples—

Barbed Blind.....lb. 9¢10¢
 Electricians' Association list.....75¢10¢
 Fence Staples, same price as Barbed Wire. See Trade Report.
 Poultry Netting.....80¢10¢
 Grand Crossing Tack Co.'s list.....75¢10¢

Steels, Butchers'—

Dick's.....40¢
 Foster Bros.....40¢
 C. & A. Hoffmann's.....40¢
 Nichols Bros.....50¢

Steelyards.....25¢25¢10¢**Stocks and Dies—**

Blacksmiths'.....40¢
 Gardner.....50¢
 Green River.....25¢
 Lightning Screw Plate.....35¢
 Little Giant.....25¢
 Ro co's New Screw Plates.....25¢30¢
 Curtis Reversible Ratchet Die Stock.....25¢

Stone—**Scythe Stones—**

Pike Mfg. Co., list '95-'96.....33¢4¢
 Cleveland Stone Co., list Nov., '92.....33¢4¢

Oil Stones, &c.

Pike Mfg. Co.:
 Hindustan No. 1, 1 lb.....8¢
 Sand Stone.....5¢
 Turkey Oil Stone, Extra.....33¢4¢
 5 to 3 lb.....33¢4¢10¢
 Turkey Slips.....80¢
 Lily White Washita.....60¢
 Rosy Red Washita.....60¢
 Washita Stone, Extra.....50¢
 Washita Stone, No. 1.....40¢
 Washita Stone, No. 2.....30¢
 Lily White Slips.....90¢
 Rosy Red Slips.....90¢
 Washita Slips, Extra.....80¢
 Washita Slips, No. 1.....70¢
 Arkansas Stone, No. 1, 3 to 5 lb.....22¢3¢
 Arkansas Stone, No. 1, 5 to 10 lb.....23¢50¢

Tanite Mills:
 Emery Oil, gr. doz. \$5.00.....50¢60¢

Stones—**Cherry—**

Enterprise.....25¢30¢

Stops, Bench—

Millers Falls.....15¢10¢
 Morrill's.....gr. doz. No. 1, \$10.00; No. 2, \$11.00, 40¢20¢

Stops, Window—

Ives' Patent.....25¢5¢
 Taplin's.....45¢

Stove Boards—

See Boards, Stove.

Stove Polish—See Polish, Stove.**Straps, Box—**

Cary's Universal, case lots.....20¢10¢

Stretchers, Carpet—

Cast Iron, Steel Points.....doz. 55¢65¢
 Cast Steel, Polished.....doz. \$3.25
 Socket.....doz. \$1.75

Stuffers, Sausage—

Miles' Challenge, gr. doz. \$30.....50¢50¢5¢
 Enterprise Mfg. Co.....25¢25¢7¢5¢
 National Specialty Mfg. Co., list Jan. 1, '97.....30¢

Tacks, Brads, &c.—

List Jan. 15, '99.
 Carpet Tacks:
 American Blue.....90¢90¢10¢
 American Tinned.....90¢90¢10¢
 American Cut Tacks.....85¢10¢85¢10¢10¢
 Swedes Iron Tacks.....90¢20¢90¢25¢
 Swedes Upholsterers' Tacks.....90¢20¢90¢25¢
 Gimp Tacks.....90¢20¢90¢25¢
 Lace Tacks.....90¢20¢90¢25¢
 Trimmers' Tacks.....80¢90¢10¢
 Looking Glass Tacks.....70¢70¢10¢
 Bill Posters' and Railroad Tack.....90¢20¢90¢25¢
 Hungarian Nails.....80¢5¢80¢15¢
 Common and Patent Brads.....70¢5¢
 Trunk and Clout Nails.....75¢5¢75¢10¢5¢

NOTE.—The above prices are for straight weights. An extra 5% is given Star Weights and an extra 10% on Standard Weights.

Miscellaneous—

Double Point Tacks.....90¢5¢90¢10¢
 Steel Wire Brads, R. & E. Mfg. Co.'s list.....50¢10¢60¢
 See also Nails, Wire.

Tanks, Oil—

Emerald, S. S. & Co.....30-gal. \$3.20
 Emerald, S. S. & Co.....60-gal. \$4.00
 Queen City S. S. & Co., 0-gal.....\$3.50
 Queen City S. S. & Co., 60-gal.....\$4.25

Tapes, Measuring—

American Asses' Skin.....40¢10¢50¢
 Patent Leather.....25¢30¢5¢
 Steel.....40¢10¢5¢
 Chesterman's.....25¢25¢5¢
 Eddy's Steel.....40¢40¢5¢
 Eddy's Metallic.....33¢33¢5¢
 Keuffel & Esser Co., Steel and Metallic.....35¢
 Lower list, 1899.....33¢33¢5¢
 Lufkin's Steel.....30¢5¢
 Lufkin's Metallic.....30¢5¢

Thermometers—

Tin Case.....80¢80¢10¢

Ties, Bale—Steel.

Standard Wire.....50¢10¢5¢

Ties, Wall—

Cleveland, Steel.....gr. 1000, \$10.00

Tinners' Shears, &c.—

See Shears, Tinners', &c.

Tinware—

Stamped, Japanned and Piced, sold very generally at net prices.

Tire Benders, Upsetters, &c.—See Benders and Upsetters, Tire.**Tobacco Cutters—**

See Cutters, Tobacco.

Tools—

Coopers'—

L. & I. J. White.....20¢20¢5¢

Saw—

Atkins' new list.....40¢
 Simonds' Improved.....33¢4¢
 Simonds' Crescent.....25¢

Ship—

L. & I. J. White.....25¢

Transom Lifters—

See Lifters, Transom.

Traps—Game—

Oneida Pattern.....70¢10¢75¢5¢
 Newhouse.....45¢50¢
 Hawley & Norton.....85¢5¢70¢
 Victor (Oneida Pattern).....75¢75¢10¢
 Star (Blake Pattern).....65¢10¢70¢5¢

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 9@10¢
 Mouse, Round or Square Wire.....doz. \$0.85@1.00
 (Genuine):
 No. 1, Rat, gr. doz. \$12.00; case of 24 \$10.50
 No. 3, Rat, gr. doz. \$5.50; case of 50 \$4.00
 No. 3 1/2, Rat, gr. doz. \$4.50; case of 72 \$3.00
 No. 4, Mouse, gr. doz. \$3.50; case of 72 \$2.75
 No. 5, Mouse, gr. doz. \$2.75; case of 150 \$2.25
 Schuyler's Rat Killer, No. 1, gr. gr. \$30.00; No. 2, gr. gr. \$30.00; mouse, No. 3, \$13.00.....50¢
 Out of Sight, Mouse, No. 1, gr. doz. 90¢; Rat, No. 2, \$1.25; Mole, \$0.00; Gopher, \$1.50; Stop Thief, No. 1, \$1.25; No. 2, \$1.50.

Fly—

Balloon, Globe or Acme.....doz. \$1.25; gr. \$1.50@15.00
 Harper, Champion or Paragon.....doz. \$1.50; gr. \$1.70

Trimmers, Spoke—

Bonney's Nos. 1 and 2.....40¢
 Douglas' gr. doz. \$9.00.....20¢
 Stearns'.....25¢

Trowels—

D. stone Brick and Point'ng.....30¢30¢
 Liston Plastering.....25¢
 D. stone "Standard Brand" and Gable Trowels.....40¢
 Never-Break steel Garden Trowels.....gr. \$7.00
 Peace's Plastering.....30¢
 Rose Brick and Plastering.....25¢5¢
 Woodrough & McParlin, Plastering.....25¢10¢

Trucks, Warehouse, &c.—

B. & L. Block Co.'s list.....40¢
 Daisy Stove Trucks, improved pattern.....gr. \$18.00

Tubs, Wash—

No. 1 \$ \$ \$
 Galvanized, per doz. \$5.00 5 50 6 00
 Galv. nized S. S. & Co., with Wringer Attachment, gr. doz. No. 10, \$7.25
 No. 20, \$7.75; No. 30.....\$8.25

Twine—

Miscellaneous—

Flax Twine—
 No. 9, 1/4 and 1/2-lb. Balls.....22¢ 26¢
 No. 12, 1/4 and 1/2-lb. Balls.....19¢ 22¢
 No. 18, 1/4 and 1/2-lb. Balls.....16¢ 19¢
 No. 24, 1/4 and 1/2-lb. Balls.....16¢ 19¢
 No. 36, 1/4 and 1/2-lb. Balls.....15¢ 18¢
 Chalk Line, Cotton, 1/2-lb. Balls.....18¢30¢
 Cotton Mops, 6, 9, 12 and 15 lb. to doz.....7@8¢
 Cotton Wrapping, 5 Balls to lb.....9@16¢
 American 2-Ply Hemp, 1/4 and 1/2-lb. Balls.....10¢12¢
 American 3-Ply Hemp, 1-lb. Balls.....10¢12¢

India 2-Ply Hemp, 1/4 and 1/2-lb. Balls (Spring Twine).....94¢

India 3-Ply Hemp, 1-lb. Balls.....94¢

India 3-Ply Hemp, 1 1/2-lb. Balls.....8 1/2@9¢

2, 3, 4 and 5-Ply Jute, 1/2-lb. Balls.....7 1/2¢

Mason Line, Linen, 1/2-lb. Balls.....45¢

No. 26 Mattress, 1/4 and 1/2-lb. Balls.....35¢

Wool.....6¢

Vises—

Solid Box.....80¢.....%

Bonney's Saw Vises.....40¢10¢

Parallel—

Atchafalca Machine Co.:
 Simpson's Adjustable.....40¢
 Standard.....40¢
 Amateur.....25¢
 Bonney's.....40¢10¢
 Fisher & Norris Double Screw.....15¢10¢
 Hollands'.....40¢40¢10¢
 Lewis Tool Co.....90¢50¢
 Massey's Perfect.....15¢20¢
 Massey's Clincher.....30¢40¢
 Merrill's.....90¢
 Miller's Falls.....low list 10¢

Parker's:
 Regular.....20¢25¢
 Vulcan's.....20¢25¢
 Combination Pipe.....55¢60¢
 Prentiss.....20¢25¢
 Sargent's.....60¢60¢10¢
 Simpson's Adjustable.....40¢
 Snelker's X. L.....20¢25¢
 Stephens'.....20¢25¢
 Toles' Woodworking.....25¢
 Trenton.....40¢5¢40¢10¢

Saw Filers—

Bonney's No. 1, \$13; No. 3, \$8.50@10¢
 Dis-ton's D 3 Clamp and Guide.....25¢
 Reading.....40¢10¢
 Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....30¢74¢

Miscellaneous—

Biggall & Keeler Combination Pipe Vise.....60¢
 Parker's Combination Pipe:
 87 Series.....60¢
 187 Series.....60¢5¢
 No. 870.....40¢

Wads—Price Per M.

B. E., 11 up.....60¢
 B. E., 9 and 10.....70¢
 B. E., 8.....80¢
 B. E., 7.....80¢
 P. E., 11 up.....\$1.00
 P. E., 9 and 10.....1.25
 P. E., 8.....1.50
 P. E., 7.....1.50
 Ely's B. E., 11 and larger.....\$1.70@1.75
 Ely's P. E., 13 to 20.....\$3.00@3.25

Wagon Jacks—

See Jacks, Wagon.

Ware, Hollow—

Aluminum—

S. S. & Co. Reduced List.....40¢

Cast Iron, Hollow—

Stove Hollow Ware:
 Ground.....60¢60¢7 1/2¢
 Unground.....65¢65¢10¢
 White Enamelled Ware:
 Moslin Kettles.....75¢10¢75¢10¢5¢
 Boilers and Saucepans.....55¢55¢5¢
 Tinned Boilers and Saucepans.....55¢55¢5¢

See also Pots, Glue.

Enamelled—

Agate Nick 1 Steel Ware, list July '99, 40¢
 Granite Ware, list Jan. 1, '94, revised Jan. 2, '95.....40¢10¢
 Second Quality, Agate Nickel Steel.....65¢
 Second Quality, Granite.....70¢10¢70¢10¢10¢

Iron Clad:
 Peppercorn Ware, high list.....70¢
 Princess Ware, special list.....30¢5¢
 Mottled Ware, high list.....75¢
 Never-Break Enamelled.....50¢50¢10¢

Tea Kettles—

Galvanized Tea Kettles:
 Inch.....6 7 8 9
 Each.....40¢ 45¢ 50¢ 60¢

Steel Hollow Ware.

Avery Spiders & Griddles.....65¢65¢5¢
 Avery Kettles.....60¢50¢10¢
 P. re-lau-d.....50¢50¢10¢
 Never-Break Spiders and Griddles.....65¢65¢5¢
 Never-Break Kettles.....60¢60¢10¢
 Solid Steel Spiders & Griddles.....70¢70¢5¢
 Solid Steel Kettles.....80¢
 Solid Steel Ware, Enamelled.....50¢5¢

Silver Plated Hollow—

William Rogers Mfg. Co.....40¢10¢

Washboards—

Solid Zinc.....gr. doz.
 Crescent, family size, bent frame.....\$3.00
 Red Star, laundry size, stationary protector.....\$4.25

Double Zinc Surface:
 Saginaw Globe, family size, stationary protector.....\$2.65
 Wilson, family size, bent frame.....\$2.75

Single Zinc Surface:
 Naird protector, family size, open back perforated.....\$2.40
 Saginaw Globe, protector, family size, ventilated back.....\$2.25
 Wilcox, bent frame, family size, ventilated back.....\$2.25

Washers—**Leather, Axle—**

Solid.....80¢10¢10¢85¢
 Paten.....85¢85¢55¢
 Coil: 1/4 1 1 1/2 1 3/4 Inch
 12c 13c 14c 16c per 100

Iron or Steel—

Size bolt.... 5-16 3/4 1/2 5/8 3/4
 Washers.....\$6.20 5.30 4.00 3.80 3.60
 In lots less than one keg add 1/4c per
 lb., 5-lb. boxes add 1/4c to list.
 NOTE—Jobbers' prices generally lower
 than manufacturers'.

Washer Cutters—

See Cutters, Washer.

Washing Machines—

See Machines, Washing.

Water Coolers—

See Coolers, Water.

Weaners—

Tyler's New Heater—No. 1 @ doz. \$3.45;
 No. 2, \$3.70; No. 3, \$4.00; No. 4, \$4.30
 Tyler's Safety—Nos. 1 and 2, @ doz. \$1.70;
 No. 3, \$2.00; No. 4, \$2.30.

Wedges—

Oil Finish.....lb. 4¢1/4¢

Axe Finish.....lb. 4¢1/4¢

Weights, Sash—

Carloads at factory.....\$18.00@20.00
 Less than carloads at factory.....
 \$20.00@22.00

Note—Some Foundries are naming
 higher prices.

Well Buckets, Galvanized

See Pails, Galvanized.

Wheels Well—

8-in., \$1.75@2.00; 10-in., \$2.25@2.50;
 12-in., \$2.75@3.25; 14-in., \$3.00@3.50

Wire and Wire Goods—

Market: Nos. 6 to 16:
 Br. & Ann.....70¢5¢72¢5¢
 Cop'd.....65¢5¢67¢5¢
 Galv.....65¢5¢67¢5¢
 Tin'd, Tin'd list.....72¢5¢75¢5¢

Stone, Br. and Ann'd:
 Nos. 19 to 26.....77¢5¢77¢5¢
 Nos. 27 to 36.....77¢5¢77¢5¢

Annealed Wire on Spools.....
 60¢10¢60¢10¢5¢

Brass, list Feb. 26, '96.....15¢

Copper, list Feb. 26, '96.....15¢
 Cast Steel Wire.....50¢
 Stubs' Steel Wire.....\$6.00 to \$2.40¢
 Wire Clothes Line, see Lines.
 Wire Picture Cord, see Cord.

Bright Wire Goods—

Iron and Brass, list July 1, 1899.....
 80¢10¢30¢10¢10¢

Wire Cloth and Netting—

Galvanized Wire Netting.....75¢10¢5¢30¢
 Painted Screen Cloth per 100 ft.....
 \$1.40@

Wire Barb—See Trade Report.**Wire, Rope—See Rope, Wire.****Wrenches—**

Agricultural.....75¢5¢75¢10¢
 Baxter's S.....70¢
 Coes' Genuine.....43¢10¢5¢5¢3¢
 Coes' Mechanics.....33¢10¢10¢5¢5¢3¢
 Agne.....60¢10¢
 Aiken's Pocket (Bright).....\$2.00@3.20
 Alligator.....60¢10¢10¢

Bemis & Call's:
 Adjustable S.....35¢5¢
 Adjustable Pipe.....40¢
 Briggs' Pattern.....30¢10¢
 Combination Black.....40¢10¢
 Combination Bright.....40¢5¢
 Cylinder or Gas Pipe.....55¢
 Extra Heavy.....45¢
 Merrick's Pattern.....50¢
 No. 3 Pipe, Bright.....55¢
 Bindley Automatic.....30¢
 Boardman's.....34¢
 Bull Dox, W. & B.....60¢10¢10¢
 Donohue's Engineer.....40¢10¢
 Eagle.....50¢10¢
 Hercules.....50¢
 Solid Handles, P. S. & W.....60¢10¢10¢
 Stevenson.....55¢
 Stillson's.....55¢

Wrought Goods—

Staples, Hooks, &c., list March 17,
 '92.....80¢20¢85¢

Yokes, Neck—

Covert Saddlery Works Trimmer 1, 60¢5¢
 Covert Saddlery Works, Neck Yoke
 Centers.....70¢

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers & Freighters'..
 list net

Zinc—

Sheet.....lb 7¢1/4¢50

PAINTS, OILS AND COLORS.—Wholesale Prices.**White Lead, Zinc, &c.**

Lead, Foreign white, in Oil.....7¢1/2¢8¢1/4
 Lead, American white, in Oil:
 Lots of 500 lb or over.....@ 6
 Lots less than 500 lb.....@ 6 1/4
 Lead, White, in oil, 25 lb tin
 pails, add to keg price.....@ 1/4
 Lead, White, in oil, 12 1/2 lb tin
 pails, add to keg price.....@ 1
 Lead, White, in oil, 1 to 5 lb as
 sorted tins, add to keg price.....@ 1 1/4
 Lead, White, Dry in bbls.....@ 5 1/2
 Lead, American, Terms: On lots of 500
 lbs. and over, 60 days, or 2% for cash if
 paid in 15 days from date of invoice.
 Zinc, American, dry.....@ 4 1/4@ 5
 Zinc, Paris, Red Seal.....@ 8 1/2
 Zinc, Paris, Green Seal.....@ 9 1/2
 Zinc, Antwerp Red Seal.....@ 7 1/2
 Zinc, Antwerp, Green Seal.....@ 8 1/2
 Zinc, V. M. in Poppy Oil, G. Seal
 lots of 1 ton and over.....@ 11 1/4
 lots less than 1 ton.....@ 12 1/4
 Zinc, V. M. in Poppy Oil, Red Seal,
 lots of 1 ton and over.....@ 10 1/4
 lots less than 1 ton.....@ 11 1/4
 DISCOUNTS.—V. M. French Zinc.—Dis-
 counts to buyers of 10 bbl. lots of one or
 assorted grades, 15; 25 bbls., 2%; 50 bbls.,
 4%. No discount allowed on less than 10
 bbl. lots.

Dry Colors.

Black, Carbon.....@ 6 @ 10
 Black, Drop, Amer.....3 @ 5
 Black, Drop, Eng.....5 @ 10
 Black, Ivory.....9 @ 20
 Blue, Celestial.....@ 5 @ 8
 Blue, Chinese.....33 @ 40
 Blue, Prussian.....50 @ 35
 Blue, Ultramarine.....7 @ 35
 Brown, Spanish.....1 @ 1
 Brown, Vandyke, Amer.....1 1/4 @ 2 1/4
 Brown, Vandyke, Foreign.....2 1/4 @ 5 1/4
 Carmine, No. 40, in bulk.....\$2.20@2.35
 Carmine, No. 40, in bottles, 2.40¢

Carmine, No. 40, in ounce bot. 2.40@3.50
 Green, Chrome, ordinary.....5 @ 6
 Green, Chrome, pure.....19 @ 25
 Lead, Red, bbls. and 1/2 bbls.....@ 6
 Lead, Red, kegs.....@ 6 1/4
 Litharge, bbls. and 1/2 bbls.....@ 6
 Litharge, kegs.....@ 6 1/4
 Ocher, French Washed.....1 1/4 @ 2 1/4
 Ocher, German Washed.....4 1/4 @ 5
 Ocher, American.....@ 10.00@15.00
 Orange Mineral, English.....@ 9 1/4@10 1/4
 Orange Mineral, French.....@ 11 1/4
 Orange Mineral, German.....10 @ 10 1/4
 Orange Mineral, American.....7 1/4 @ 8 1/4
 Red, Indian, English.....4 1/4 @ 5 1/4
 Red, Indian, American.....3 @ 3 1/4
 Red, Turkey, En. II.....7 1/4 @ 10
 Red, Tuscan, English.....7 @ 10
 Red, Venetian, Amer.....@ 100 @ 80
 Red Venetian, English.....1 1/4 @ 1 1/4
 Sienna, Italian, Burnt and
 Powdered.....@ 2 1/4 @ 5
 Sienna, Ital., Raw, Powd.....2 1/4 @ 5
 Sienna, American, Raw.....1 1/4 @ 1 1/4
 Sienna, American, Burnt and
 Powdered.....@ 1 1/4 @ 1 1/4
 Talc, French.....@ 100 @ 1.25 @ 1.50
 Terra Alaba, French.....@ 100 @ 1.00
 Terra Alaba, English.....85 @ 100
 Terra Alaba, American No. 1.....@ 70
 Terra Alaba, American No. 2.....@ 45 @ 50
 Umber, Turkey, Bnt. & Powd.....2 1/4 @ 3 1/4
 Umber, Turkey, Raw & Powd.....2 1/4 @ 3 1/4
 Umber, Bnt. Amer.....1 1/4 @ 1 1/4
 Umber, Raw, Amer.....1 1/4 @ 1 1/4
 Yellow, Chrome.....10 @ 25
 Vermilion, American Lead.....10 @ 20
 Vermilion, Quicksilver, bbls
 or kegs.....@ 67
 Vermilion, Quicksilver, bags.....@ 68
 Vermilion, Quicksilver, sm' pkgs.....@ 70
 Vermilion, English, Import.....@ 69
 Vermilion Chinese.....80 @ 90

Colors in Oil.

Black, Lampblack, Best.....10 @ 14
 Black, Lampblack, Common.....10 @ 11

Blue, Chinese.....35 @ 40
 Blue, Prussian.....32 @ 33
 Blue, Ultramarine.....12 @ 16
 Brown, Vandyke.....8 @ 13
 Green, Chrome.....8 @ 14
 Green, Paris.....@ 24
 Sienna, Raw.....10 @ 13
 Sienna, Burnt.....@ 13
 Umber, Raw.....8 @ 12
 Umber, Burnt.....8 @ 12

Miscellaneous.

Barytes, Foreign, @ ton.....\$18.00@20.00
 Barytes, Amer. Roasted.....19.00@20.00
 Barytes, Crude.....9.00@10.00
 Chalk, in bulk.....@ 2.15 @ 2.25
 Chalk, in bbls.....@ 100 @ 35
 China Clay, English.....@ 15.00@17.00
 Cobalt, Oxide.....@ 100 @ 2.00 @ 2.10
 Whiting, Common.....@ 100 @ 42¢ @ 50
 Whiting, Gliders.....@ 4¢ @ 5¢
 Whiting, extra Gliders.....57¢ @ 64

Putty.

In barrels and 1/2 bbls.....@ 1 7-10
 In tin cans.....@ 34
 In bladders.....@ 2.20

Spirits Turpentine.

In Southern bbls.....@ 59¢ @
 In machine bbls.....@ 52¢ @

Glue.

Low Grade.....@ 13 @ 15
 Cabinet.....@ 13 @ 16
 Medium White.....@ 14 @ 16
 Extra White.....@ 16 @ 23
 French.....@ 12 @ 25
 Irish.....@ 13 @ 15

Animal, Fish and Veget-

table Oils.
 Linseed, City, Raw.....@ gal. 48 @ 49
 Linseed, City, boiled.....@ 53 @ 51
 Linseed, S. & S. and West'n, raw.....@ 47

Linseed, raw Calcutta see 1.....@ 65
 Lard, Prime.....44 @ 45
 Lard, Extra No. 1.....38 @ 39
 Lard, No. 1.....34 @ 36
 Cotton-seed, Crude.....25¢ @ 26
 Cotton-seed, Summer Yellow,
 prime.....29 @ 29 1/4
 Cotton-seed Summer Yellow,
 off grades.....28 @
 Sperm, Crude.....@
 Sperm, Natural Spring.....@
 Sperm, Bleached Spring.....@
 Sperm, Natural Winter.....@
 Sperm, Bleached Winter.....58 @ 59
 Whale, Crude.....@
 Whale, Natural Winter.....@ 43
 Whale, Bleached Winter.....@ 45
 Whale, Extra Bleached Win.....@ 48
 Menhaden, Crude, Sound.....25 @ 27
 Menhaden, Light Pressed.....28 @ 29
 Menhaden, Bleached Winter.....@ 32
 Menhaden, Extra Bleached.....@ 34 @ 35
 Tallow, Western, prime.....49 @ 51
 Cocoonut, Ceylon.....64¢ @ 65¢
 Cocoonut, Cochiti.....84 @ 84 1/4
 Cod, Domestic.....34 @ 36
 Cod, Newfoundland.....34 @ 40
 Red Elaine.....29 @ 31
 Red Saponified.....@ 43¢ @ 47¢
 Bank.....@
 Straits.....@
 Olive, Italian, bbls.....58 @ 59
 Neatsfoot, prime.....45 @ 50
 Palm, foot, Lagos.....@ 54 @ 54 1/4

Mineral Oils.

Black, 20 gravity, 25 gal cold
 test.....10 1/4 @ 11
 Black, 20 gravity, 15 cold test, 11 1/4 @ 12
 Black, summer.....10 @ 10 1/4
 Cylinder, light filter 1.....14 1/4 @ 17
 Cylinder, dark filter 1.....12 1/4 @ 17 1/4
 Paraffine, 903-907 gravity.....12 @ 12 1/4
 Paraffine, 903 gravity.....11 @ 11 1/4
 Paraffine, 883 gravity.....9 1/4 @ 10
 Paraffine, red, No. 1.....12 @ 12 1/4
 In small lots 1/4c advance.

THE IRON AGE.

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